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ABSTRACT

This guide delineates the tasks and performance standards for radiologic technology occupations. It includes job seeking skills, work attitudes, energy conservation practices, and safety. The guide is centered around the three domains of learning: psychomotor, cognitive, and affective. For each duty, the following are provided: task, standard of performance, source of standard, conditions for performance, enabling objectives, resources, teaching activities, criterion-referenced measure, performance guide, and evaluation checklist. Topics covered include administrative and clerical functions, patient care, support services, testing/therapeutic procedures, radiation safety, and continuing education. Appendixes include (1) task lists and job titles; (2) definitions; (3) a tool and equipment list; and (4) a 295-item bibliography, a 48-item state-of-the art bibliography, and lists of 6 professional organizations, 15 scholarly journals, 41 textbooks, 9 videotapes, 13 slide presentations, and 9 sources of standards. (KC)

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CURRICULUM GUIDE

FOR

RADIOLOGIC TECHNOLOGY OCCUPATIONS

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for the Job Titles of

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Radiologic Technologist DOT: 078.362-026

Nuclear Medicine Technologist DOT: 078.361-018

Radiation Therapy Technologist DOT: 078.361-034

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INTRODUCTION

V-TECS guides are extensions of the V-TECS catalog. While the V-TECS catalogs compile duties, task performance objectives, and performance guides, the catalogs emphasize the psychomotor aspect of an occupation. In addition, V-TECS catalogs establish blueprints of the occupations, while V-TECS guides consider background information surrounding the tasks as well as the process of making inferences, generalizations, and decisions. V-TECS guides take these aspects of the learning process into consideration, and go a step further by including job seeking skills, work attitudes, energy conservation practices, and safety.

Experience has shown that the art of learning can also be taught while teaching subject matter. Studies indicate that people need to learn how to learn. V-TECS guides are written to deal with this learning process as an efficient means of assisting instructors in the task of teaching.

V-TECS guides are centered around the three domains of learning: the Psychomotor, cognitive, and affective. The following is a brief explanation of the learning domains.

PSYCHOMOTOR

V-TECS guides are developed around the psychomotor tasks that are considered worker oriented. Psychomotor or manipulative skills such as tightening a nut, replacing a hubcap, or machining a key slot in a steel shaft, are identified in the V-TECS catalog, but the suggestions on how to learn to do these tasks are addressed in the V-TECS curriculum guides.

COGNITIVE

To perform psychomotor tasks, students must think. To tighten a nut they must know which way to turn it and when to stop turning it so that they won't strip the threads. If replacing a hubcap, there is a certain technique that may vary from one car to another. For example, start the hubcap by placing the cap in a tilted position and tapping it all the way around until it is seated. On a different model, it may be necessary to position the hubcap and snap it all at once. At any rate, students must think about what is being done. This is cognitive or a mental activity. Cognitive is defined as: what goes on in the mind about any job being done. V-TECS guides provide both the collateral knowledge and the impetus to apply cognition to psychomotor tasks.

Students gain the cognitive through both real and vicarious experiences. They may read, view tapes, memorize or practice a process or procedure until they are certain of it. To test their knowledge, students may be required to decide the procedure, method, or sequence for performance. This is decision making or cognitive activity in its highest form.

Cognition is that process by which information is stored and used. The voice that warns one of potential dangers, is cognition. It is cognition that tells one to lock and tag out the power supply to an electrical apparatus before starting to repair it. However, cognition does not apply only to safety. Good cognition, or thinking, can help employees do a job better and quicker. V-TECS curriculum guides provide for the cognitive aspects of learning.

AFFECTIVE

Curriculum writers, supervisors, and instructors often fail to assist students in acquiring a positive attitude toward themselves, their job, school or fellow students. V-TECS guides seek to provide assistance to the instructor in achieving positive attitudes. It is difficult for the instructor to identify little bits and pieces of desirable behavior for every unit and often harder yet to teach them.

In this area, students might be judged on how well they clean up their work area, whether they showed up to do the job in time, or whether they must be told several times to do something. Potential employers are interested in student attitudes because attitudes directly reflect work habits.

A student's ability to succeed on the job depends largely on attitude. If, for example, students have the attitude: "Let someone else do it", they could be in trouble. Realizing this, V-TECS curriculum guides include activities designed to help the student get along with others.

USE OF V-TECS CURRICULUM GUIDE

The curriculum guides are designed to provide job-relevant tasks, performance objectives, performance guides, resources, learning activities, evaluation standards and achievement testing in selected occupations.

A V-TECS guide is designed to be used with any teaching methods. If a lecture/demonstration method is best for you, you will find sufficient help to meet your needs. If, however, you prefer to use discussions or other methods that require student participation, the V-TECS curriculum guides can save preparation time and offer innovative methods and procedures. Further, this work takes into consideration students' attitudes, thinking skills, and mathematical reading skills.

The use of small groups in teaching can be helpful in a number of ways: (1) many students may feel inadequate due to their lack of background information in mechanical areas; (2) some may feel that they are physically incompetent or lack the necessary background experiences. A successful program can provide students with a sense of security by reinforcing positive attitudes while improving their skills and knowledge. The task/learner-centered approach can be achieved by allowing students to interact on a personal level. Confidence increases when students discover that they are an essential part of a team engaged in the learning-teaching process. Students learning to work without direct supervision, permits the instructor to vary instructional routines away from the lecture or other full-class methods.

The V-TECS curriculum guides provide suggestions for specific classroom activities. These activities are not meant to be restrictive but a suggested variety of learning activities for each task. Students may complete any or all parts of the activities.

CURRICULUM GUIDESHEETS

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 1

TASK: Schedule department work load.

STANDARD OF PERFORMANCE OF TASK:

Examinations requiring special preparation and/or a radiologist's presence must be scheduled in advance and conform to established department protocol considering the patient's condition.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Radiologist's schedule
Pen/pencil
Technologist's work schedule
Schedule book
Department scheduling protocol

ENABLING OBJECTIVES:

1. Identify types of examinations requiring scheduling.
2. Verify that previously scheduled exams do not conflict with newly schedule exams.
3. Review established department protocol for pre-exam preparation.
4. Review established department policy/procedure for scheduling department workload.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Scheduling book.
4. Scheduling information sheet.
5. Blank scheduling sheet.
6. Blank appointment card.
7. Prep book/preparation guidelines.
8. Scheduling sheet.
9. Checklist - Scheduling examinations.

TEACHING ACTIVITIES:

1. Present lecture on types of examinations requiring scheduling. (* 1,2 & 3)
2. Conduct class discussion on meaning of request status. (* 1,2 & 3)
3. Explain information logged in schedule book. (* 1,2 & 3)
4. Demonstrate how to log appointment in scheduling book. (* 3,4 & 5)
5. Monitor students as they practice logging an appointment in the scheduling book.
6. Discuss procedure for filling out an appointment card. (* 1,2,4 & 6)
7. Present lecture on the importance and reason for pre-exam patient preparations for specialized examinations. (* 1,2 & 7)
8. Demonstrate how to fill out an appointment card. (* 4 & 6)
9. Monitor students as they practice filling out appointment cards.
10. Assign mock scheduling information to student and instruct student to log information in scheduling book. (* 8)
11. Assign student to complete an appointment card using mock scheduling information. (* 7)

CRITERION-REFERENCED MEASURE:

The student must log the examination information in the department workload scheduling book, complete an appointment card containing all department protocol information, and inform patient of pre-exam preparations.

PERFORMANCE GUIDE:

1. Receive request for exam and determine if the exam needs to be scheduled.
2. Determine the status of the request: STAT, ASAP, at patient's earliest convenience, at department's earliest convenience:
    - A. STAT: Provide patient with preparation instructions, and contact necessary personnel to proceed with exam.
    - B. ASAP: Provide patient with preparation instructions, and schedule exam as soon as possible, according to physician's/ radiologist's advice.

PERFORMANCE GUIDE: (cont.)

   - C. At patient's earliest convenience: Provide patient with offered schedule openings and agree on appointment time. Provide patient with preparation instructions.
   - D. At department's earliest convenience: Refer to schedule book, and offer patient appointment times that do not increase a heavily scheduled day.
3. Log the following information in the schedule book:
   - A. Date and time exam was scheduled.
   - B. Type of exam scheduled.
   - C. Patient's name, identification number, address, phone number, and date of birth.
   - D. Referring physician's name.
   - E. Inpatient or Outpatient.
4. Provide patient with appointment card:
   - A. Time.
   - B. Date.
   - C. Location (department).
5. Provide patient with pre-exam instructions.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Schedule department workload.

ENABLER

1. Review established department policy/procedure for scheduling department workload.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist when evaluating student's performance while scheduling department workload.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Received request for exam.		
2.	Established if exam should be scheduled.		
3.	Identified the status of the request.		
4.	Logged type of exam, date and time scheduled , patient's name, identification number, address, phone number, date of birth and referring physician.		
5.	Provided patient with appointment card.		
6.	Provided pre-exam instructions to patient.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 2

TASK: Assign daily work to employees.

STANDARD OF PERFORMANCE OF TASK:

Daily assignment sheet must be completed and provided to technologist prior to the start of the shift and must include technologist's name, identification number, date, hours on duty, and scheduled examination/therapy procedures to be performed by the technologist.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Department work load schedule
Daily assignment
Technologist's work schedule

ENABLING OBJECTIVES:

1. Arrange department work load schedule.
2. Determine scheduled technologist's certifications and examination capabilities.
3. Review established department protocol for assigning daily work to employees.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO:C.V. Mosby Company.
3. Mock Information Sheet - Daily workload.
4. Blank employee sheet.
5. Employee daily assignment sheet.
6. Checklist - Assign daily work.

TEACHING ACTIVITIES:

1. Conduct class discussion about the importance of the daily work assignment sheet. (* 1 & 2)
2. Discuss how to determine daily assignments for technologist. (* 1 & 2)

TEACHING ACTIVITIES: (cont.)

3. Demonstrate how to complete daily assignment sheets. (* 1,2 & 4)
4. Monitor students while they practice completing a daily employee work assignment sheet. (* 3 & 5)
5. Assign student a mock information sheet and instruct them to fill in the daily workload sheet. (* 6)

CRITERION-REFERENCED MEASURE:

The student must establish the department workload, identify the technologists on duty, evenly distribute work assignments, complete daily assignment sheets and provide the technologists with completed daily assignment sheets prior to start of shift.

PERFORMANCE GUIDE:

1. Establish department work load.
2. Compare technologist's work schedules with department work load.
3. Complete daily assignment sheet for each technologist.
    - A. Technologist's name and identification number.
    - B. Date.
    - C. Hours on duty.
    - D. Scheduled examination/therapy procedures.
    - E. Allow scheduled time for lunch and breaks.
4. Provide technologists with their scheduled workloads for the day, prior to start of the shift.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Assign daily work to employees.

ENABLER

1. Arrange department workload schedule.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist when evaluating student's performance while assigning daily work to employees.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Established department workload.		
2.	Obtained blank daily assignment sheets.		
3.	Compared department workload chart to technologist's work schedule.		
4.	Distributed daily workload evenly among technologists.		
5.	Completed daily assignment sheets.		
6.	Assigned technologists their scheduled workloads for the day shift.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 3

TASK: Maintain daily log of examination/therapy procedures performed.

STANDARD OF PERFORMANCE OF TASK:

Examination/therapy procedures must be recorded on a daily basis in the department examination/therapy log, including patient name and identification number, date, time, test/therapy performed, performing technologist, and notes or comments on the daily examination/therapy log.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Pen/pencil
Department examination/therapy log

ENABLING OBJECTIVES:

1. Review established department protocol.
2. Identify test/therapy coding.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology Management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Blank test/therapy log sheet.
4. Examination/therapy data.
5. Test/therapy log sheet.
6. Checklist - Complete test/therapy daily log.

TEACHING ACTIVITIES:

1. Discuss the purpose of the department examination/therapy daily log. (* 1 & 2)
2. Present lecture on daily logging procedure. (* 1,2 & 3)
3. Conduct class discussion on the information included in examination/therapy log and the importance of its accuracy. (* 1 & 2)

TEACHING ACTIVITIES: (cont.)

4. Demonstrate the procedure for completing a examination/therapy daily log. (* 1,2 & 3)
5. Monitor student practicing logging procedure for examination/therapy data. (* 5)
6. Assign student mock examination/therapy data and instruct the student to log the data on blank daily log sheets. (* 6)

CRITERION-REFERENCED MEASURE:

The student must identify daily examination/therapy performed, log the daily examination/therapy information on the dated daily log sheet and file the logged information according to department protocol.

PERFORMANCE GUIDE:

1. Identify examination/therapy procedure performed.
2. Enter daily examination/therapy procedures in department examination/therapy log:
   - A. Patient name and identification number.
   - B. Date and time.
   - C. Examination/therapy performed.
   - D. Performing technologist's name and identification number.
   - E. Inpatient or outpatient.
3. Enter additional notes or comments in daily log.
4. Count total number of examinations and record at the end of the day.
5. File daily log according to institution's policies and procedures.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Maintain daily log of examination/therapy procedures procedures performed.

ENABLER

1. Identify examination/therapy coding.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance while maintaining a daily log of examination/ therapy procedures.

PERFORMANCE DETERMINANTS	YES	NO
1. Identified examination/therapy procedures performed to date.	____	____
2. Entered examination/therapy procedures completed in department examination/ therapy log.	____	____
3. Entered any notes or comments in the daily examination/therapy log.	____	____
4. Filed daily examination/therapy log in accordance with department protocol.	____	____

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 4

TASK: Maintain monthly exam count chart.

STANDARD OF PERFORMANCE OF TASK:

The number of different exams performed by the radiology department must be recorded in the monthly exam count chart including exam name, total number of exams, date of entry, and recorder's signature or initials.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Pen/pencil
File cabinet
Monthly exam count chart
Daily examination/therapy log

ENABLING OBJECTIVES:

1. Locate daily examination/therapy log sheets.
2. File records in accordance with department protocol.
3. Review established department policy/procedures for maintaining monthly test count chart.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Blank exam count chart.
4. Daily examination/therapy log sheets.
5. Monthly exam count chart.
6. Checklist - Complete monthly exam count chart.

TEACHING ACTIVITIES:

1. Discuss reasons for maintaining a monthly exam count chart. (* 1 & 2)
2. Question students on the type of information that would be included on a monthly exam count chart.

TEACHING ACTIVITIES: (cont.)

3. Demonstrate how to maintain a monthly exam count chart. (* 1,2, & 3)
4. Monitor students as they practice maintaining a monthly exam count chart. (* 4 & 5)
5. Assign student daily examination/therapy log sheet and instruct student to complete a blank monthly exam count chart. (* 6)

CRITERION-REFERENCED MEASURE:

The student must assemble the daily examination/therapy logs for the month, complete a monthly exam count chart, and file the monthly count chart according to department protocol.

PERFORMANCE GUIDE:

1. Obtain blank monthly exam count chart.
2. Assemble daily examination/therapy logs for whole month.
3. Identify the different types of examination/therapy performed.
4. Log number of patients.
   NOTE: Number of patients may differ from number of exams.
5. Compile total number of each exam performed during month.
6. Record exam numbers on monthly exam count chart.
7. Sign or initial count entry.
8. File count entry for future reference.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Maintain monthly exam count chart.

ENABLER

1. Locate and retrieve daily examination/therapy log.

STUDENT'S NAME______________________________**DATE**___________

EVALUATOR'S NAME______________________________**COURSE**_________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when maintaining monthly exam count chart.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Assembled daily examination/therapy logs.		
2.	Identified the different types of examination/therapy performed.		
3.	Logged number of patients.		
4.	Compiled total number of each exam performed during month.		
5.	Recorded total examination/therapy numbers on monthly exam count charts.		
6.	Signed or initialed count entry.		
7.	Filed count entry for future reference.		
8.	Compiled total monthly exam count using a computer.		
9.	Made a printout of monthly exam count chart using a computer.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 5

TASK: Prepare maintenance requests.

STANDARD OF PERFORMANCE OF TASK:

Maintenance requests must be completed including maintenance contractor and address, equipment serial number, problem description, date of problem request, status and type of maintenance agreement. Prepared maintenance request must be submitted to the chief technologist, supervisor, maintenance department or maintenance contractor.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Pen/pencil
Maintenance contract
Maintenance request forms

ENABLING OBJECTIVES:

1. Identify equipment under maintenance contracts.
2. Identify maintenance contract vendor for specific equipment.
3. Complete a maintenance request.
4. Review established department protocol for preparing maintenance request.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology Management: An Introduction. St. Louis, MO: C.V. Mosby Company.
3. Maintenance request.
4. Maintenance vendor information.
5. Blank maintenance request.
6. Checklist - Completing a maintenance request.

TEACHING ACTIVITIES:

1. Conduct class discussion on the pros and cons of maintenance contracts on radiologic equipment. (* 1 & 2)

TEACHING ACTIVITIES: (cont.)

2. Discuss department protocol for submitting maintenance requests. (* 1)
3. Discuss information needed to complete a maintenance contract. (* 1,2 & 3)
4. Demonstrate how to complete a maintenance contract. (* 1,2 & 3)
5. Monitor student practicing filling out a maintenance request. (* 4 & 5)
6. Assign student mock maintenance information and instruct the student to complete a maintenance request form following department protocol. (* 6)

CRITERION-REFERENCED MEASURE:

The student must identify the maintenance contract vendor, complete the maintenance request, and submit request according to department protocol.

PERFORMANCE GUIDE:

1. Establish if maintenance contract exists and identify name and address of contractor.
2. Obtain blank maintenance request form.
3. Enter maintenance request information:
    - A. Maintenance contractor's name and address.
    - B. Equipment serial number.
    - C. Description of the problem.
    - D. Date of problem occurrence.
    - E. Status of request:
        1. Urgent.
        2. ASAP.
        3. At contractor's convenience.
        4. Due date.
4. Sign or initial maintenance request form.
5. Forward request to appropriate person:
    - A. Maintenance contractor.
    - B. Chief technologist or supervisor.

      NOTE: Make a copy of all maintenance requests.
6. File a copy of the maintenance request form in the records for future use.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Prepare maintenance requests.

ENABLER

1. Identify equipment under maintenance contract.
2. Identify maintenance contract vendors.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance while preparing maintenance requests.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Identified equipment needing maintenance.		
2.	Established if maintenance contract exists.		
3.	Identified name and address of maintenance contractor.		
4.	Completed maintenance request form including contractor's name and address, equipment, serial number, description of problem, date of problem, occurrence, and status of request.		
5.	Signed maintenance request form.		
6.	Forwarded request to appropriate person.		
7.	Filed a copy of the maintenance request form in accordance with department protocol.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 6

TASK: Schedule special exams and procedures.

STANDARD OF PERFORMANCE OF TASK:

Special exams and procedures must be scheduled at a time that a registered technologists and/or radiologists with training and experience with the specialized area is on duty to perform the exam or procedure. Scheduling information must include patient's name, exam to be performed, date of exam and time of exam.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Appointment cards
Department work load chart
Technologist's work schedule
Examination/therapy scheduling log

ENABLING OBJECTIVES:

1. Locate examination/therapy scheduling log, department work load schedule and technologist's work schedule.
2. Identify special exams and procedures.
3. Review established department protocol for scheduling special exams and procedures.

RESOURCES:

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Examination/scheduling log, workload schedule & technologist work schedule.
4. Scheduling log and appointment card.
5. Special procedure information.
6. Special procedure scheduling log and appointment card.
7. Checklist - Complete special procedure appointment.

TEACHING ACTIVITIES:

1. Discuss department procedure for scheduling special procedures. (* 1)
2. Question students on why the scheduling of special procedures is important. (* 2)
3. Demonstrate how to determine scheduling for a special procedure. (* 1,2 & 3)
4. Monitor student practice of special procedure scheduling. (* 5 & 6)
5. Discuss the importance of special procedure appointment cards. (* 1,2 & 4)
6. Demonstrate how to fill out an appointment card. (* 1,2 & 4)
7. Monitor student practice while filling out an appointment card. (* 5 & 6)
8. Assign the student mock information sheets, and blank appointment cards and instruct student to schedule the special procedures and complete corresponding appointment cards. (* 7)

CRITERION-REFERENCED MEASURE:

The student must establish the date and time to schedule the special procedure, log the scheduled procedure and complete a corresponding appointment card following department protocol/procedures.

PERFORMANCE GUIDE:

1. Identify the exam/special procedure to be performed.
2. Obtain examination/therapy scheduling log, department work load schedule and technologist's work schedule.
3. Establish date and time that specialized equipment and personnel will be available.
4. Confirm date with requesting physician/patient and provide physician/patient with appropriate information regarding preparation for exam.
5. Record procedure in examination/therapy scheduling log:
   A. Patient's name, phone number, and patient history.
   B. Exam/special procedure to be received.
   C. Date of exam.
   D. Time of exam.
6. Provide patient with an appointment card.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Schedule exams and special procedures.

ENABLER

1. Identify special procedures.

STUDENT'S NAME ______________________ **DATE** __________

EVALUATOR'S NAME ______________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when scheduling exams and special procedures.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Identified the exam/special procedure to be performed.		
2.	Obtained examination/therapy scheduling log, department work load schedule and technologist's work schedule.		
3.	Established date and time that specialized equipment and personnel will be available.		
4.	Confirmed date with requesting physician/patient.		
5.	Provided physician/patient with appropriate information regarding preparation for exam.		
6.	Recorded procedure in examination/ therapy scheduling log including patient information, exam/special procedure information, date and time of exam and referring physician.		
7.	Provided patient with appointment card.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 7

TASK: Check reason for nonappearance of patient for scheduled examination/treatment.

STANDARD OF PERFORMANCE OF TASK:

The reason for nonappearance for a scheduled exam must be identified and rescheduling of the examination/treatment must be arranged if desired by patient.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Phone
Appointment card
Examination/therapy scheduling log

ENABLING OBJECTIVES:

1. Identify scheduled examinations and patient status.
2. Identify methods to communicate with patient.
3. Review establish department policy/procedure for checking reason for nonappearance of patient for exam.

RESOURCES:

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Patient information sheet.
4. Checklist - Patient follow-up.

TEACHING ACTIVITIES:

1. Present lecture on patient nonappearance follow-up procedure. (* 1 & 2)
2. Discuss patient status and methods of contacting patient. (* 1 & 2)
3. Question student as to possible causes for the nonappearance of a patient.

TEACHING ACTIVITIES: (cont.)

4. Demonstrate how to determine patient status and appropriate methods of contact for that status. (* 1)
5. Observe while student practices patient follow-up procedure.
6. Assign the student a mock information and a partner and instruct the student to determine why the patient did not show up for the examination. (* 3 & 4)

CRITERION-REFERENCED MEASURE

The student must establish the patient's status, contact the patient, determine why the patient did not appear for the exam, and verify if the examination should be rescheduled.

PERFORMANCE GUIDE:

1. Obtain examination/therapy scheduling chart and patient's record.
2. Establish status of patient and contact.
   A. Inpatient:
      1. Call nurse's station on patient's floor.
      2. Identify reason for nonappearance of patient.
      3. Determine if patient will be brought for examination or should be rescheduled.
   B. Outpatient:
      1. Call referring physician or patient.
      2. Identify reason for nonappearance.
      3. Determine if patient should be rescheduled.
      4. Send memo to physician advising of patient's absence for exam.
3. Reschedule exam or cancel request and remove from log.
4. Reissue a new appointment card to the patient.
5. Record new exam date in examination/therapy scheduling log.
6. Record patient's reason for non-appearance in patient's record.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Check reason for nonappearance of patient for scheduled examination/treatment.

ENABLER

1. Determine scheduled examinations and patient status.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when checking reason for nonappearance of patient for scheduled exam/therapy.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained examination/therapy scheduling chart.	______	______
2.	Obtained patient's record.	______	______
3.	Established status of patient.	______	______
4.	Contacted patient and established reason for nonappearance.	______	______
5.	Rescheduled or cancelled exam.	______	______
6.	Updated examination/therapy scheduling log.	______	______
7.	Reissued a new appointment card.	______	______
8.	Recorded patient's reason for non-appearance in patient's record.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 8

TASK: Develop policy and procedure manuals.

STANDARD OF PERFORMANCE OF TASK:

Policy and procedure manuals must include federal, state, local and institutional rules, regulations, guidelines, and procedures for operating a radiology department. Policy and procedure manuals must provide radiologic technologists with established guidelines and procedures to follow.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Paper
Pen/pencil
Institution/hospital policy manual
Radiologic technology resource books
Typewriter/computer or word processor
Federal, state, and local regulations/guidelines

ENABLING OBJECTIVES:

1. Identify federal, state, local and institutional rules, regulations, guidelines and procedures for operating a radiology department.
2. Identify institutional formats used for policy/procedure manuals.
3. Review established department policy/procedure for developing policy and procedure manual.

***RESOURCES:**

1. Federal rules & regulations manual.
2. State rules & regulations manual.
3. Local rules & regulations manual.
4. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
5. Policy/procedure manual from other department.
6. Radiology department information.
7. Checklist - Preparing a policy\procedure manual.

TEACHING ACTIVITIES:

1. Discuss the importance of a policy/procedure manual to a radiology department. (* 4 & 5)
2. Question students about how a policy/procedure manual could make a radiology department more efficient. (* 4 & 5)
3. Discuss the parts of a radiology department policy procedure manual. (* 4,5 & 6)
4. Conduct class discussion on the parts they think should be included and why. (* 4 & 5)
5. Discuss the methods for locating the information and resources necessary for developing a policy procedure manual. (* 1,2,3,4 & 5)
6. Monitor student as they practice identifying and compiling policy/procedure information and resources.
7. Discuss methodology for reviewing a policy/ procedure manual. (* 4 & 5)
8. Assign a mock information sheet containing information about a radiology department and instruct student to outline a policy/procedure manual based on the information. (* 6 & 7)

CRITERION-REFERENCED MEASURE:

The student must establish department needs, identify resource materials, and outline a policy/procedure manual according to local, state, and federal regulations and guidelines.

PERFORMANCE GUIDE:

1. Identify specialized areas of radiologic technology to be developed:
   A. X-ray technology.
   B. Ultrasound technology.
   C. Nuclear medicine technology.
   D. Radiation therapy technology.
2. Assemble resource materials in specialized area to be developed:
   A. Textbooks.
   B. Instruction manuals.
   C. Slide/films.
   D. Consultants:
      1. Incumbents.
      2. Instructors.
      3. Administrators.
      4. Curriculum developers.
   E. Existing policy/procedure manuals.

PERFORMANCE GUIDE: (cont.)

3. Compile essential information and place in required format.
4. Enter formatted information into computer/word processor/typewriter and print or type out.
5. Distribute review copy to incumbents working in specialized field to verify content.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Develop policy and procedure manual.

ENABLER

1. Identify federal, state, local and institutional rules, regulations, guidelines and procedures.

STUDENT'S NAME__________________________ **DATE**__________

EVALUATOR'S NAME________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when developing a policy/procedure manual.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Identified specialized areas of radiologic technology to be developed.	______	______
2.	Assembled resource materials in specialized areas to be developed.	______	______
3.	Compiled essential information and placed in required format.	______	______
4.	Entered formatted information into computer/word processor/typewriter.	______	______
5.	Printed or typed out manual.	______	______
6.	Distributed review copy to incumbents working in field.	______	______
7.	Edited reviewed copies of the manual.	______	______
8.	Submitted revised copy of policy/procedure manual to appropriate supervisors for approval.	______	______
9.	Conducted meeting with technologists to explain and distribute completed policy/procedure manual.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 9

TASK: Develop pre-exam and postexam procedure sheets.

STANDARD OF PERFORMANCE OF TASK:

Procedure sheets must provide the technologist with established steps, regulations, reports, and qualifications to be followed prior to the examination and after the examination.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Paper
Pen/pencil
Procedure manual (if available)
Procedure resource materials

ENABLING OBJECTIVES:

1. Identify procedures needing pre-exam or postexam procedure sheets.
2. Review established department protocol for performance of exams.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company
3. Special procedures list.
4. Sample procedure sheets.
5. Checklist - Preparing a procedure sheet.

TEACHING ACTIVITIES:

1. Present lecture on procedures which require pre-exam and postexam sheets. (* 1,2 & 3)
2. Conduct class discussion on the purpose and necessity of pre-exam and postexam procedure sheets. (* 1 & 2)
3. Discuss information included in pre-exam and postexam procedure sheets. (* 1 & 2)

TEACHING ACTIVITIES: (cont.)

4. Question students as to where pre-exam and postexam procedure sheet information can be found. (* 1 & 2)
5. Demonstrate to students how a pre-exam or postexam procedure sheet is created. (* 1,2,3 & 4)
6. Observe students while they practice developing a pre-exam or postexam sheet.
7. Assign student a procedure and instruct them to develop a pre-exam or postexam procedure sheet. (* 6)

CRITERION-REFERENCED MEASURE:

The student must establish if a pre-exam, postexam, or both should be developed; identify information to be included and write the pre-exam or postexam in accordance with department protocol.

PERFORMANCE GUIDE:

1. Identify exam needing procedure sheet.
2. Assemble exam procedure resource materials.
3. Create procedure sheet.
    A. Rules/regulations.
    B. Steps to follow.
    C. Dangers or cautions.
    D. Reports.
    E. Qualifications.
4. Distribute the procedure sheets to incumbent technologist and physicians for review.
5. Provide technologists with final copy of procedure sheet.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Develop pre-exam and postexam procedure sheets.

ENABLER

1. Identify exams/therapy needing pre-exam or postexam procedure sheets.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance while developing pre-exam and postexam procedure sheets.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Identified examination/therapy needing procedure sheets.	____	____
2.	Assembled exam procedure resource materials.	____	____
3.	Created procedure sheets including rules/regulations, steps to follow, dangers or cautions, reports and qualifications.	____	____
4.	Distributed the procedure sheets to incumbents, technologists and physicians for review.	____	____
5.	Edited the reviewed procedure sheets.	____	____
6.	Provided technologists with final copy of procedure sheets.	____	____

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 10

TASK: Develop patient information sheets.

STANDARD OF PERFORMANCE OF TASK:

Patient information sheets must provide the patient with an explanation of the procedure, possible side effects and instructions/directions to be followed prior to the procedure and after the procedure. Explanations/instructions and directions must be complete, concise, accurate and easily understood by lay persons.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Paper
Pen/pencil
Procedure resource materials

ENABLING OBJECTIVES:

1. Identify procedures needing patient information sheets.
2. Review instructions/directions for specific procedures.
3. Review established department protocol for specific examinations.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Procedure information.
4. Sample information sheet.
5. Checklist - Developing patient information sheet.

TEACHING ACTIVITIES:

1. Discuss the functions of a patient information sheet. (* 1 & 2)
2. Conduct a class discussion addressing the pros and cons of patient information sheets. (* 1 & 2)

TEACHING ACTIVITIES: (cont.)

3. Present lecture on the types of information included in a patient information sheet. (* 1,2 & 4)
4. Question students on the types of materials needed to develop a patient information sheet. (* 1,2 & 4)
5. Discuss types of materials used in developing a patient information sheet and where they could be located. (* 1 & 2)
6. Demonstrate how to compile a patient information sheet. (* 1,2 & 4)
7. Monitor student practicing patient information sheet development.
8. Assign student a mock procedure sheet and instruct the student to develop a patient information sheet. (* 3 & 5)

CRITERION-REFERENCED MEASURE:

The student must identify procedures needing patient information sheets, identify resource materials and develop patient information sheets in accordance with department protocol.

PERFORMANCE GUIDE:

1. Identify procedure needing information sheet.
2. Assemble exam procedure information and materials.
3. Create patient information sheet:
    - A. Exam explanation.
    - B. Pre-exam instruction/directions.
    - C. Postexam instructions/directions.
    - D. Possible side effects or warning signs.
4. Distribute patient information sheet to incumbents and physicians for review.
5. Edit reviewed information sheets.
6. Print the information sheets and file them for distribution at the time of scheduling.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Develop patient information sheets.

ENABLER

1. Identify procedures needing patient information sheets.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when developing patient information sheets.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Identified exams needing patient information sheets.		
2.	Assembled exam procedure information and materials.		
3.	Created patient information sheet including exam explanation, pre-exam instructions/directions, postexam instructions/directions, and possible side effects or warning signs.		
4.	Distributed patient information sheet to incumbents and physicians for review.		
5.	Edited reviewed patient information sheet.		
6.	Printed the patient information sheet.		
7.	Filed information sheets for distribution at scheduling time.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 11

TASK: Prepare exam report forms/charts for physician.

STANDARD OF PERFORMANCE OF TASK:

All report forms/charts must be complete with all pertinent clinical information before being presented to physician for review or interpretation. Clinical information must include: patient's name, identification number, date of birth, address, and referring physician.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Pen/pencil
Appropriate forms/charts
Clinical history/information

ENABLING OBJECTIVES:

1. Identify department charts and forms required by physician.
2. Review established department protocol for preparing exam report forms/charts.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Sample department charts/forms.
4. Patient/procedure information.
5. Checklist - Completing physician charts/forms.

TEACHING ACTIVITIES:

1. Discuss the types of exam report forms/charts used in radiology departments. (* 1,2 & 3)
2. Conduct a class discussion on the importance and usefulness of exam report forms/charts to the physician. (* 1 & 2)

TEACHING ACTIVITIES: (cont.)

3. Show the students examples of typical radiologic forms/charts. (* 1,2 & 3)
4. Discuss examples of pertinent information required on radiologic exam report forms and charts. (* 1,2 & 3)
5. Demonstrate how to complete typical exam report form. (* 1 & 2)
6. Demonstrate how to complete a typical exam report chart. (* 1 & 2)
7. Observe students while they practice completing a exam report form and chart.
8. Assign student a radiologic exam report information sheet and instruct the student to complete a exam report form and chart. (* 4 & 5)

CRITERION-REFERENCED MEASURE:

The student must complete the exam report forms/charts for physician interpretation according to department protocol.

PERFORMANCE GUIDE:

1. Assemble forms/charts and label with patient's name, identification number, date of birth, address, and referring physician's name.
2. Indicate procedure/treatment requested.
3. Document any pertinent clinical history/information on form.
4. Present to physician for review or interpretation.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Prepare exam report forms/charts for physician.

ENABLER

1. Identify exam report forms/charts required by the physician.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when preparing exam report forms/charts for the physician.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Assembled exam report forms/charts.		
2.	Labeled forms/charts with patient information.		
3.	Indicated procedure or treatment requested.		
4.	Documented pertinent clinical history/information on form.		
5.	Presented forms/charts to physician for interpretation or review.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 12

TASK: Follow-up patient diagnosis.

STANDARD OF PERFORMANCE OF TASK:

Diagnostic follow-up must determine if patient exam diagnosis was accurate according to treatment results.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Physician's treatment finding
Quality assurance record

ENABLING OBJECTIVES:

1. Review physician's diagnosis of patient's exam results.
2. Identify radiology department quality control protocol.

***RESOURCES:**

1. Department policy/procedure manual.
2. Department quality assurance guidelines.
3. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
4. Physician diagnosis and treatment results.
5. Quality assurance sheet.
6. Checklist - Follow-up of patient diagnosis.

TEACHING ACTIVITIES:

1. Discuss the reasons for patient diagnosis follow-up. (* 1,2 & 3)
2. Ask students to give a written definition of quality assurance. (* 3)
3. Conduct class discussion on the purpose and importance of quality assurance in a radiology department. (* 1 & 3)

TEACHING ACTIVITIES: (cont.)

4. Present lecture on the procedure for a patient diagnosis follow-up. (* 1,2 & 3)
5. Demonstrate the procedure for a patient diagnosis follow-up. (* 1,2,3 & 5)
6. Assign student mock physician's diagnosis sheets and treatment results sheets and instruct them to perform a patient diagnosis follow-up. (* 4)
7. Discuss procedure for filing follow-up diagnosis information in quality assurance file. (* 1,2 & 3)
8. Demonstrate procedure for filing follow-up information in quality assurance file. (* 1 & 2)
9. Assign student a patient diagnosis follow-up sheet and have the student file the follow-up information in the quality assurance file. (* 6)

CRITERION-REFERENCED MEASURE:

The student must perform a patient diagnosis follow-up, verify diagnosis accuracy, and file the follow-up findings in the quality assurance file in accordance with department protocol.

PERFORMANCE GUIDE:

1. Obtain patient's chart and physician's treatment results.
2. Compare diagnosis to treatment results.
3. Record diagnosis accuracy in quality assurance record.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Follow-up patient diagnosis.

ENABLER

1. Review physican's diagnosis of patient's exam results.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance while following up on patient diagnosis sheets.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained patient's chart/records.		
2.	Identified treatment results.		
3.	Reviewed physician's diagnosis.		
4.	Compared diagnosis to treatment results.		
5.	Verified diagnosis accuracy.		
6.	Recorded diagnosis accuracy in quality assurance record.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 13

TASK: Monitor staff exposure to radiation.

STANDARD OF PERFORMANCE OF TASK:

All personnel working in areas in which there is radiation must be monitored for radiation exposure. Reports of exposure must be monitored on a monthly basis and maintained as a permanent record. Any reading exceeding 312 mr per quarter must be reported to the State Department of Nuclear Safety.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Radiation monitoring device
Radiation exposure report

ENABLING OBJECTIVES:

1. Identify department sources of radiation exposure.
2. Identify methods of preventing or minimizing radiation exposure to the staff.
3. Identify types of radiation monitors used by department.
4. Review department policy/procedure concerning the reporting of staff medical radiation dosage and exposure.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1985). Radiographic positions and radiographic procedures, (6th ed.) Vol. 1. St. Louis, MO: C.V. Mosby Company.
3. Bernier, D.; Langan, K. and Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
4. Early, P. and Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
5. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.

RESOURCES: (cont.)

6. Gurley, L. and Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
7. Stevens, M. and Phillips, R. (1983). Comprehensive review for the radiologic technologist. St. Louis, MO: C.V. Mosby Company.
8. Statkiewicz, M. and Ritneour, R. (1983). Radiation protection for student radiographers. St. Louis, MO: C.V. Mosby Company
9. Sample radiation monitoring devices.
10. Personal radiation monitoring devices.
11. Checklist - Monitoring radiation exposure.

TEACHING ACTIVITIES:

1. Discuss the need for radiation protection efforts by technologists working with or around radiation producing equipment. (* 1,2,3 & 8)
2. Present lecture on types of radiation monitoring devices. (* 2,3,4,8 & 10)
3. Discuss usage of monitoring device and how they are worn. (* 2 & 8)
4. Demonstrate how to use each of the different monitoring devices in accordance with department protocol. (* 1,2 & 8)
5. Assign student a monitoring device and instruct the student to use the device. (* 9)
6. Present lecture on measuring radiation exposure. (* 2,3,4,5,6 & 8)
7. Discuss sources of radiation and explain their significance in dose accumulation. (* 2,3,4,6 & 8)
8. Discuss how to read radiation monitoring devices. (* 2,3,4 & 6)
9. Demonstrate how to read radiation exposure from different monitoring devices. (* 2,3,4,6 & 8)
10. Discuss federal, state, local and institutional rules, regulations and guidelines governing radiation exposure and reports. (* 1)
11. Demonstrate how to complete radiation exposure reports. (* 1,3,4 & 8)
12. Conduct class discussion on the need of a permanent radiation exposure file. (* 1)
13. Assign students to complete monitoring radiation exposure simulation. (* 11)

CRITERION-REFERENCED MEASURE:

The student must identify the type of radiation monitoring device needed, issue a radiation monitoring device to the technologist, measure the exposure dose and complete a radiation exposure report in accordance with established protocol.

PERFORMANCE GUIDE:

1. Provide each employee with radiation monitoring device.
2. Instruct employee on how and where the badge should be worn in compliance with department protocol.
3. Provide employee with usage instructions:
   A. Monitoring devices will be worn on daily basis.
   B. Monitoring devices will be left in the department during off duty hours.
   C. Film monitoring devices will not be left in exam rooms during fluoroscopy or other radiation procedures.
4. Collect monitoring devices and issue replacement devices on a predetermined schedule.
5. Determine dosage, review, and record.
6. Any monitoring device recording 312 mr per calendar quarter necessitates a formal report to the State Department of Nuclear Safety.
7. File records in appropriate permanent file.
8. Review report at quarterly radiation safety and medical isotope committee meeting.
9. Post monthly radiation exposure report for staff verification.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Monitor staff exposure to radiation.

ENABLER

1. Determine the amount of radiation exposure to the staff/technologists.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**_________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance during the radiation exposure simulation.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Provided each employee with a radiation monitoring device.	____	____
2.	Instructed employee on how to wear the monitoring device.	____	____
3.	Provided employee with daily usage instruction.	____	____
4.	Collected monitoring devices.	____	____
5.	Determined dosage, reviewed, and recorded.	____	____
6.	Completed required federal, state or local reports.	____	____
7.	Completed personnel radiation exposure report.	____	____
8.	Filed report in permanent file.	____	____
9.	Posted monthly radiation report for staff verification.	____	____

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 14

TASK: Prepare safety and incident reports.

STANDARD OF PERFORMANCE OF TASK:

Incident report information must include, a report from persons involved, signature of persons involved, witness statement and signature, date and location of incident, and incident details/descriptions required by local, state or federal regulations. The report must be dated, signed, and forwarded to the appropriate safety authority within 24 hours of the occurrence.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS nuclear medicine catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Incident report forms
A situation in which a reportable incident occurred

ENABLING OBJECTIVES:

1. Identify department protocol for reporting incidents.
2. Communicate with persons involved.
3. Identify incident reports required for state, local and federal requirements.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Ehrlich, R.A., McCloskey, E. and Kruse R. (1985). Patient care in radiography. St. Louis, Mo: C.V. Mosby Company.
4. Early, P. and Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

5. Incident report form.
6. Incident information.
7. Mock incident report form.
8. Checklist - Filling out an incident report form.

TEACHING ACTIVITIES:

1. Conduct class discussion on types of incidents which might occur in a radiology department. (* 1,2,3 & 4)
2. Discuss federal, state, local and institutional rules, regulation and guidelines governing the reporting of an incident. (* 1,2,3 & 4)
3. Demonstrate how to fill out an incident report. (* 1,2,3,4,5 & 6)
4. Monitor student practice at filling out an incident report. (* 7)
5. Discuss department protocol for reporting an incident. (* 1)
6. Question students concerning the agencies that are contacted concerning an incident. (* 1,2,3 & 4)
7. Assign students to prepare a safety/incident report for a mock simulation. (* 8)

CRITERION-REFERENCED MEASURE:

The student must determine the facts about the incident, complete the incident form, and forward the incident report to the indicated person/agency.

PERFORMANCE GUIDE

1. Verify written log or oral report from persons involved.
2. Complete prescribed incident report forms.
3. Verify written report before it is signed by persons involved.
4. Sign and date forms.
5. Forward original and required number of copies to indicated person or immediate supervisor.
6. File form copy in department files in chronological order.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Prepare safety and incident report.

ENABLER

1. Identify department protocol for preparing safety and incident report.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when preparing a safety and incident report.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Verified written log or oral report from persons involved.		
2. Completed prescribed incident report form.		
3. Verified written report before it was signed by persons involved.		
4. Signed and dated forms.		
5. Forwarded original and required copies of report to regulatory agency.		
6. Filed form copy in department files.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 15

TASK: Perform radiologic equipment quality control check.

STANDARD FOR PERFORMANCE OF TASK:

Radiologic equipment and instruments tested must be operating within specifications as established by department procedure, or state/federal regulations. The department supervisor must be notified of any equipment not meeting regulations. Quality control reports must be completed and submitted in accordance with federal, state and local regulations.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Calculator
Radionuclide source
Quality control record book
Laboratory instruments
Nuclear medicine equipment
Ultrasonic equipment
Radiation therapy equipment
Radiographic equipment
Radiographic film processor

ENABLING OBJECTIVES:

1. Identify equipment needing daily, weekly, monthly or quarterly quality control checks.
2. Recall federal, state, and local regulations regarding quality control.
3. Review established department policy/procedure for conducting radiologic equipment quality control check.

***RESOURCES:**

1. Department policy/procedure manual.

***RESOURCES:** (cont.)

2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
5. Cusworth, R. (1983). Quality assurance in diagnostic radiology: An eight-step methodology (lesson 1-3). St. Louis, MO: C.V. Mosby Company.
6. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
8. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
9. Radiographic imaging equipment.
10. Radiographic film processing equipment.
11. Nuclear medicine equipment.
12. Ultrasound equipment.
13. Radiation therapy equipment.
14. Quality control record book.
15. Checklist - Performing radiologic equipment quality control checks.

TEACHING ACTIVITIES:

1. Conduct class discussion on the purpose and importance of quality control program. (* 1,5 & 6)
2. Discuss and show types of laboratory equipment which need quality control checks. (* 1,2 & 3)
3. Demonstrate procedure for conducting quality control checks on laboratory equipment. (* 2,3,5 & 6)
4. Discuss and show types of radiologic equipment which need quality control checks. (* 1,4,5 & 9)
5. Demonstrate procedure for conducting quality control checks on radiologic equipment. (* 4,5,6,9 & 10)
6. Discuss and show types of nuclear medicine equipment which need quality control checks. (* 1,2 & 3)

TEACHING ACTIVITIES: (cont.)

7. Demonstrate procedure for conducting quality control checks on nuclear medicine equipment. (* 2,3,6,7 & 11)
8. Discuss and show types of ultrasound equipment which need quality control checks. (* 1,4,8 & 12)
9. Demonstrate procedure for conducting quality control checks on ultrasound equipment. (* 4,5,6 & 8)
10. Discuss and show types of radiation therapy equipment which need quality control checks. (* 1,4,7 &13)
11. Demonstrate procedure for conducting quality control checks on radiation therapy equipment. (* 6,7,8 & 13)
12. Present lecture on federal, state and local regulations regarding quality control. (* 1,2,3,5 & 6)
13. Show students how to enter test results in quality control record book. (* 1 & 14)
14. Monitor students practicing quality control checks on various equipment. (* 9,10,11,12,13 & 14)
14. Supervise and evaluate students as they perform quality control checks. (* 15)

CRITERION REFERENCE MEASURED:

The student must identify equipment needing quality control checks, perform quality control checks, record quality control test results in quality control record book, report any unacceptable test results to department supervisor and file any federal, state and/or local regulation reports.

PERFORMANCE GUIDE:

1. Conduct laboratory instruments checks:
   A. Water bath.
   B. Freezer.
   C. Refrigerator.
   D. Precision pipettes.
   E. Centrifuges.
2. Conduct radiologic equipment checks:
   A. Radiographic imaging equipment.
   B. Radiographic film processing equipment.
   C. Radiographic chemicals.
   D. Radiographic monitor.
   E. Cine projector.
   F. Metallic replacement unit.
   G. Darkroom.

PERFORMANCE GUIDE: (cont.)

2. Conduct radiologic equipment checks: (cont.)
    - H. Viewbox.
    - I. Intensifying screens and cassettes.
3. Conduct nuclear medicine equipment checks:
    - A. Scintillation camera.
    - B. Dose calibrator.
    - C. Well-type detector.
    - D. Flat field detector.
    - E. Gamma counter.
    - F. SPECT system.
    - G. Survey meter.
4. Conduct ultrasound equipment checks:
    - A. Ultrasound scan system.
    - B. Transducers.
    - C. Monitors.
    - D. Ancillary recording device.
    - E. Exam object or phantom.
5. Conduct radiation therapy equipment checks:
    - A. External beam radiation treatment machine.
    - B. Radiation treatment simulation machine.
    - C. Radiographic imaging equipment.
    - D. Radiographic film processing equipment.
6. Record quality control test results in quality control record book.
7. Report any unacceptable test results to department supervisor immediately.
8. File quality control report as required by federal, state and local regulations.

CHECKLIST

DUTY Performing Administrative And Clerical Functions

TASK Perform radiologic equipment quality control check.

ENABLER

1. Recall equipment needing daily, weekly, monthly or quarterly quality control checks.
2. Recall federal, state, and local regulations regarding quality control.
3. Review established department policy/procedure for conducting radiologic equipment quality control check.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform radiologic equipment quality control checks.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Conducted laboratory instruments checks:		
- Water bath.	______	______
- Freezer.	______	______
- Refrigerator.	______	______
- Precision pipettes.	______	______
- Centrifuges.	______	______
2. Conducted radiologic equipment checks:		
- Radiographic imaging equipment.	______	______
- Radiographic film processing equipment.	______	______
- Radiographic chemicals.	______	______
- Radiographic monitor.	______	______

PERFORMANCE DETERMINANTS	YES	NO
2. Conducted radiologic equipment checks (cont.):		
- Cine projector.		
- Metallic replacement unit.		
- Darkroom.		
- View box.		
- Intensifying screens and cassettes.		
3. Conducted nuclear medicine equipment checks:		
- Scintillation camera.		
- Dose calibrator.		
- Well-type detector.		
- Flat field detector.		
- Gamma counter.		
- SPECT system.		
- Survey meter.		
4. Conducted ultrasound equipment checks:		
- Ultrasound scan system.		
- Transducers.		
- Monitors.		
- Ancillary recording device.		
- Exam object or phantom.		
5. Conducted radiation therapy equipment checks:		
- External beam radiation treatment machine.		
- Radiation treatment simulation machine.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
5. Conducted radiation therapy equipment checks: (cont.)		
- Radiographic imaging equipment.		
- Radiographic film processing equipment.		
6. Recorded quality control test results.		
7. Reported any unacceptable test results to department supervisor immediately.		
8. Filed quality control report as required by federal, state and local regulations.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 16

TASK: Establish working rapport with all interrelating hospital, referral, or commercial agencies.

STANDARD OF PERFORMANCE OF TASK:

Working rapport must be established by maintaining open communication line, using polite courteous manners, expediting work orders, answering questions, and sharing work related information.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Technologists
Ancillary services

ENABLING OBJECTIVES:

1. Utilize professional behavior and manners.
2. Review department protocol for establishing working rapport.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bateman, D. and Sigband, N. (1985). Teaching business communications effectively (2nd ed.). Glenview, IL: Scott, Foresman and Company.
3. Bateman, D. and Sigband, N. (1985). Business communications applications and exercises (2nd ed.). Glenview, IL: Scott, Foresman and Company.
4. Radiologic communication situations.
5. Checklist - Establishing working rapport.
6. Guest Speaker - Radiology department manager.

TEACHING ACTIVITIES:

1. Present lecture on procedure for communicating with ancillary service representative. (* 1 & 2)

TEACHING ACTIVITIES: (cont.)

2. Conduct class discussion on the importance of good working rapport with ancillary personnel. (* 1 & 2)
3. Discuss department protocol for processing a request. (* 1)
4. Instruct students to write questions to ask guest speaker concerning different situations that occur in a radiology department which require communication skills.
5. Introduce guest speaker. (* 6)
6. Demonstrate to students the procedure for communicating with an ancillary representative. (* 1,2 & 3)
7. Assign student a partner and a mock situation and instruct students to practice communicating a situation by role-playing. (* 3 & 4)
8. Assign student to establish working rapport with another student. (* 5)

CRITERION-REFERENCED MEASURE:

The student must establish working rapport with the other students, establish their needs using communication etiquette and process their request according to department protocol.

PERFORMANCE GUIDE:

1. Greet the ancillary service representative:
    A. Polite introduction:
        1. Good morning/afternoon.
        2. Hello.
    B. State department and your name.
    C. Inquire as to how you can help them.
2. Make note of request.
3. Process request immediately following department guidelines or protocol:
    A. Complete necessary forms.
    B. Contact appropriate personnel for assistance.
    C. Refer representative to contact personnel department.
4. Ask representative to call for further assistance.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Establish working rapport with all interrelating hospitals, referral or commercial agencies.

ENABLER

1. Utilize professional behavior and manners.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student`s performance while establishing working rapport.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Greeted the ancillary service representative.		
2.	Made note of request.		
3.	Completed forms necessary to process request.		
4.	Contacted appropriate personnel for assistance.		
5.	Referred representative to proper department or contact person.		
6.	Asked representative to call for further assistance.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 17

TASK: Orientate new technologists to department standard operating and administrative procedures, floor plans, equipment and supply locations.

STANDARD OF PERFORMANCE OF TASK:

New staff members must be familiar with department's administrative and operating procedures, safety practices, floor plans, and equipment/supply locations. Staff member must be able to complete assigned work safely and efficiently without harm to the patient or themself.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Department policy/procedure manual
Department floor plan
Orientation procedure sheet
Orientation packet

ENABLING OBJECTIVES:

1. Identify department layout/floor plan.
2. Review technologist's job description.
3. Review established department protocol for orientating new technologist.

***RESOURCES:**

1. Department policy/procedure manual.
2. Department floor plan/layout sheet.
3. Orientation packet.
4. Orientation procedure sheet.
5. Checklist - Conduct orientation procedure.

TEACHING ACTIVITIES:

1. Discuss the types of materials included in an orientation packet. (* 1 & 3)

TEACHING ACTIVITIES: (cont.)

2. Conduct class discussion on the need for new technologists to be orientated. (*1)
3. Discuss the department areas which should be included in the orientation tour. (* 1,2 & 3)
4. Explain how to verify technologist's job description and expectations.
5. Demonstrate the orientation procedure to students. (* 1,2,3 & 4)
6. Monitor student practice of orientation procedure.
7. Discuss the purpose and importance of an orientation procedure sheet. (* 1)
8. Demonstrate how to complete an orientation procedure sheet. (* 1,2,3 & 4)
9. Assign student to orientate a new technologist. (* 5)

CRITERION-REFERENCED MEASURE:

The student must assemble orientation materials, conduct orientation tour of the department, answer technologist's questions and obtain a signed orientation procedure sheet from the new technologist in accordance with department protocol.

PERFORMANCE GUIDE:

1. Assemble orientation materials.
2. Greet new technologist and introduce to department staff.
3. Provide technologist with department policy/procedure manual and floor plan.
4. Explain department administrative/operating procedures, safety guidelines, job description and job expectations.
5. Conduct department tour for the technologist:
   A. Examination rooms.
   B. Supply/equipment locations.
   C. Hazardous areas.
   D. Emergency routes.
6. Answer any questions the technologist may have.
   NOTE: Have technologist accompanied by an incumbent technologist for at least 2 weeks.
7. Instruct new technologist to sign orientation procedures sheet.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Orientate new technologist to department standard operating and administrative procedures, floor plans, and equipment/supply locations.

ENABLER

1. Identify department layout/floor plan.
2. Review technologist's job description.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when orientating a new technologist.

PERFORMANCE DETERMINANTS	YES	NO
1. Assembled orientation materials.		
2. Greeted new technologists and introduced them to department staff.		
3. Provided technologist with department policy/procedure manual and floor plan.		
4. Explained department administrative/operating procedures, safety guidelines, job description and job expectations.		
5. Conducted department tour including examination rooms, supply/equipment locations, hazardous areas and emergency routes.		
6. Answered any questions the technologist had.		
7. Instructed new technologist to sign orientation procedure sheets.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 18

TASK: Evaluate employee's performance.

STANDARD OF PERFORMANCE OF TASK:

Employee's performance must be compared to standardized criteria on a routine (annual or semi-annual) basis to form an evaluation. Evaluation form must be completed, signed by evaluator and evaluated technologist, and processed according to department guidelines.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Employee evaluation form
Position description
Employee's file
Continuing education file

ENABLING OBJECTIVES:

1. Identify methods of appraisal.
2. Review established department protocol for evaluating employee's performance.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L. and Callaway, W. (1986). Introduction to radiologic technology. St. Louis, MO: C.V. Mosby Company.
4. Evaluation sheet.
5. Employee's file.
6. Blank evaluation sheet.
7. Checklist - Evaluating performance.

TEACHING ACTIVITIES:

1. Present lecture on employee performance evaluation procedures. (* 1,2 & 3)

TEACHING ACTIVITIES: (cont.)

2. Discuss methods of evaluations. (* 1,2 & 3)
3. Question students on the areas considered when evaluating performance. (* 1,2 & 3)
4. Discuss method of employee performance documentation. (* 1,2,3 & 4)
5. Conduct class discussion on the advantages and disadvantages of employee performance documentation. (* 1,2 & 3)
6. Explain purpose and importance signatures on evaluation forms.
7. Demonstrate employee evaluation procedure. (* 1,2,3 & 4)
8. Monitor student practice of evaluating an employee. (* 5 & 6)
9. Assign student to evaluate an employee's performance. (* 7)

CRITERION-REFERENCED MEASURE:

The student must review the employee's records, complete an evaluation sheet and submit the evaluation to the appropriate person/department according to the department protocol.

PERFORMANCE GUIDE:

1. Review employee's file for memos, written warnings, evidence of continuing education, and letters of recognition.
2. Fill in evaluation form with duties/tasks required of employee from position description.
3. Establish employee's performance of above duties according to standard, and rate as: average, above average, or below average.
4. Document any additional comments and suggestions for improvement in a narrative form.
5. Discuss evaluation with employee.
6. Sign evaluation.
7. Obtain employee's signature on the evaluation.
8. Submit completed evaluation to appropriate person/department.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Evaluate employee performance.

ENABLER

1. Determine method of appraisal.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when evaluating employee performance.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Obtained employee's file and evaluation forms.		
2.	Reviewed employee's file for memos, warnings, continuing education, and letters of recognition.		
3.	Filled in evaluation form with duties/tasks required of employee.		
4.	Evaluated employee's performance of the listed duties.		
5.	Documented any additional comments and suggestions for improvements.		
6.	Discussed evaluation with employee.		
7.	Signed the evaluation report.		
8.	Obtained employee's signature on the evaluation report.		
9.	Submitted completed evaluation report to appropriate person/department according to department protocol.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 19

TASK: Maintain license compliance regulations.

STANDARD OF PERFORMANCE OF TASK:

Licenses must be up to date and displayed records kept current and retrievable.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Local, state and federal licenses applications
Copies of published regulations

ENABLING OBJECTIVES:

1. Review department protocol for maintaining license compliance regulations.
2. Identify federal, state and local rules and regulations.
3. Identify agencies receiving reports.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Early, P. and Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Bernier, D.; Langar, K. and Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
5. Statkiewicz, M. and Ritenour, E. (1983). Radiation protection for student radiographers. St. Louis, MO: C.V. Mosby Company.
6. Governing agencies listing.
7. Checklist - Maintain license compliance.

TEACHING ACTIVITIES:

1. Present lecture on the different radiation safety authorities. (* 1,2,3,4 & 5)

TEACHING ACTIVITIES: (cont.)

2. Discuss the Occupational Safety and Health Administration (OSHA) and how they govern the use of ionizing radiation. (* 2,3,4 & 5)
3. Discuss the Nuclear Regulatory Commission (NRC) and how they control radiation by-products produced. (* 2,3,4 & 5)
4. Conduct class discussion on the ALARA (As Low As Reasonably Achievable) concept. (* 3,4 & 5)
5. Discuss the Food and Drug Administration (FDA) authority over pharmaceutical preparations. (* 2,3,4 & 5)
6. Discuss the National Institute of Health (NIH) control of blood derivatives. (* 3,4 & 5)
7. Discuss the Department of Health and Human Services (DHHS) monitoring of radiopharmaceutical development and use. (* 3,4 & 5)
8. Present lecture on the Consumer-Patient Radiation Health and Safety Act of 1981. (* 3,4 & 5)
9. Discuss the Code of Federal Regulations. (* 3,4 & 5)
10. Demonstrate to students how license applications are applied for and maintained. (* 1,2,3,4 & 5)
11. Monitor student practice of application of licensing. (* 6)
12. Conduct group discussion of the importance of maintaining license compliance records. (* 1 & 2)
13. Demonstrate how to maintain license compliance records. (* 1,2,3,4 & 5)
14. Assign student to maintain license compliance regulations. (* 7)

CRITERION-REFERENCED MEASURE:

The student must determine the governing agency, the license compliance regulations, and reports or license applications required. The student must complete all necessary reports and applications and file the information according to department protocol.

PERFORMANCE GUIDE:

1. Notify radiation safety authority when change in safety program occurs.
2. Amend, update, or renew license when necessary.
3. Review regulations at least annually/annotate received changes.

PERFORMANCE GUIDE: (cont.)

4. Maintain required licensing records:
    - A. Radiation warning/hazard signs posted.
    - B. Receipt and disposition of all radionuclides.
    - C. Therapeutic dosages and follow up.
    - D. Protective equipment purchased.
    - E. Radioactive material shipping records.
    - F. Transfer of radioactive materials log.
    - G. Radiation exposure records on all receipts/shipments.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Maintain license compliance regulations.

ENABLER

1. Identify federal, state, and local licensing rules and regulations.

STUDENT'S NAME________________ **DATE**________

EVALUATOR'S NAME________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when maintaining license compliance.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Reviewed rules and regulations.	_____	_____
2. Amended or updated license when necessary.	_____	_____
3. Notified radiation safety authority when changes in safety program occurred.	_____	_____
4. Identified license application forms.	_____	_____
5. Filled in license application.	_____	_____
6. Forwarded license application to regulating agency.	_____	_____
7. Filed copy of application according to department protocol.	_____	_____

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 20

TASK: Maintain supply inventory.

STANDARD OF PERFORMANCE OF TASK:

The number of supplies on hand in the department supply room must be determined. Supply inventory forms must be completed including: supply name, identification number, restocking number, and number on hand. A supply purchase requisition must be completed and submitted for any supplies at or below the restocking number.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Pen/pencil
Vendor catalogs
Supply inventory forms
Supply purchase requisition

ENABLING OBJECTIVES:

1. Locate supply inventory sheets and purchase requisitions.
2. Identify type of supplies to be inventoried.
3. Review established department procedure for maintaining supply inventory.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
4. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
5. Kramer, D. (1982). Medical practice management. Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

6. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Inventory forms.
8. Purchase requisitions.
9. Vendor catalogs.
10. Checklist - Maintaining supply inventory.

TEACHING ACTIVITIES:

1. Review department procedure concerning supply inventory and purchase requisition. (* 1)
2. Conduct class discussion on information needed for inventory (i.e. supply name, identification number and number on hand) (* 1,2,3,4,5 & 6)
3. Demonstrate how to count supplies on hand and record on inventory form. (* 4,5,6 & 7)
4. Explain how to determine supplies to be restocked and how to identify vendor. (* 7 & 9)
5. Review information needed to complete a purchase requisition. (* 2,3 & 5)
6. Show students how to complete supply requisition form with all necessary information. (* 7,8 & 9)
7. Explain and demonstrate filing procedure for supply inventory and duplicate supply purchase requisition. (* 1,7 & 8)
8. Identify procedure for submitting purchase requisition to purchasing department.
9. Monitor students as they practice maintaining inventory and completing necessary forms. (* 7,8 & 9)
10. Supervise and evaluate students as they maintain inventory and complete necessary forms. (* 10)

CRITERION-REFERENCED MEASURE:

The student must count each supply on hand, record count on inventory sheet, identify supplies needing restocked, identify vendors for supplies, complete supply purchase requisition, file supply inventory sheet and duplicate purchase requisition and forward requisition to purchasing department.

PERFORMANCE GUIDE:

1. Obtain supply inventory and purchase requisitions.
2. Count the number of each supply on hand.
3. Record the supply count of the inventory form:
   - A. Supply name.
   - B. Identification number.
   - C. Number on hand.
4. Determine supplies to be restocked and the vendor to be used.
5. Complete supply purchase requisition:
   - A. Vendor's name and address.
   - B. Supply name, identification number, and unit price.
   - C. Determine total cost of supplies.
   - D. Obtain authorization signature and summit purchase requisition for processing.
6. File supply inventory and duplicate supply purchase requisition.
7. Forward purchase requisition to purchasing department.
8. Log supply deliveries:
   - A. Date received.
   - B. Item name.
   - C. Amounts received.
   - D. Notes (Damage, missing or incorrect items).
9. Contact vendor if order is incorrect or late.
10. Rotate stock with expiration date as new stock is received.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Maintain supply inventory.

ENABLER

1. Locate supply inventory sheets and purchase requisitions.
2. Identify type of supplies to be inventoried.

STUDENT'S NAME________________ **DATE**________

EVALUATOR'S NAME________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to maintain supply inventory.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained supply inventory and purchase requisitions.		
2.	Counted the number of each supply on hand.		
3.	Recorded the supply count of the inventory form.		
4.	Recorded supply name.		
5.	Recorded identification number.		
6.	Recorded number on hand.		
7.	Determined supplies to be restocked and the vendor to be used.		
8.	Completed supply purchase requisition.		
9.	Completed vendor's name and address.		
10.	Completed supply name, identification number, and unit price.		
11.	Determined total cost of supplies.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
12. Obtained authorization signature and submitted purchase requisition for processing.	________	________
13. Filed supply inventory and duplicated supply purchase requisition.	________	________
14. Forwarded purchase requisition to purchasing department.	________	________
15. Logged supply deliveries:		
- Date received.	________	________
- Item name.	________	________
- Amounts received.	________	________
- Notes (damage, missing or incorrect items).	________	________
16. Contacted vendor if order is incorrect or late.	________	________
17. Rotated stock with expiration date as new stock is received.	________	________

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 21

TASK: Store pharmaceutical supplies.

STANDARD OF PERFORMANCE OF TASK:

Pharmaceutical supplies must be stored in a secure, lockable area with authorized entry only. Expired supplies should be removed and disposed of according to local, state and federal regulations.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Locking storage cabinet room
Pharmaceutical supplies
Pharmaceutical supply inventory record

ENABLING OBJECTIVES:

1. Recall what constitutes a pharmaceutical.
2. Identify pharmaceuticals used by department.
3. Locate locking storage cabinet for pharmaceuticals.
4. Identify pharmaceutical supplies with expiration dates.
5. Review established department procedure for storing pharmaceutical supplies.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
5. Kramer, D. (1982). Medical practice management. Boston, MA: Little, Brown and Company.
6. Locking supply cabinet.

***RESOURCES:** (cont.)

7. Pharmaceutical supplies.
8. Pharmaceutical inventory sheets.
9. Checklist - Storing pharmaceutical supplies.

TEACHING ACTIVITIES:

1. Conduct class discussion on types of pharmaceutical supplies to be stored. (* 1,2,3,4 & 5)
2. Review department procedure concerning storage of pharmaceutical supplies. (* 1)
3. Demonstrate procedure for locating/assembling pharmaceutical supplies to be stored. (* 1 & 7)
4. Show students where to obtain key to supply cabinet and how to open supply cabinet. (* 1)
5. Discuss and show students the proper placement of pharmaceutical supplies within the supply cabinet. (* 1,4,5,6 & 7)
6. Explain procedure used for recording total amount of each supply on inventory sheets. (* 1 & 8)
7. Show students how to update in-cabinet inventory sheets. (* 1 & 8)
8. Explain expiration dates and demonstrate procedure for disposing of expired pharmaceutical supplies. (* 1,4,5 & 7)
9. Demonstrate how to lock pharmaceutical supply cabinet and return key to authorized person. (* 1 & 6)
10. Discuss the storage of pharmaceuticals that need to be readily available in an emergency and the use of disposable locks on pharmaceutical cabinets or emergency boxes.
11. Assign students to practice storing pharmaceutical supplies. (* 6,7 & 8)
12. Supervise and evaluate storing of pharmaceutical supplies. (* 9)

CRITERION-REFERENCED MEASURE:

The student must assemble pharmaceuticals to be stored, store pharmaceuticals in locked supply cabinet, identify and dispose of expired supplies, complete pharmaceutical inventory sheets and file inventory sheets in department file.

PERFORMANCE GUIDE:

1. Assemble pharmaceutical supplies to be stored.
2. Obtain key to pharmaceutical supply cabinet and open the cabinet.

PERFORMANCE GUIDE: (cont.)

3. Place pharmaceutical supplies in their identified storage area in the supply cabinet.
4. Identify and dispose of expired pharmaceutical supplies.
5. Record total amount of each supply on in-cabinet inventory sheet.
6. Lock pharmaceutical supply cabinet and return key to authorized person.

   NOTE: For pharmaceuticals that need to be readily obtained in an emergency technologist may get disposable padlocks on cabinet or emergency box (when used in an emergency replace drug and replace disposable padlock.)

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Store pharmaceutical supplies.

ENABLER

1. Recall what constitutes a pharmaceutical.
2. Locate locking storage cabinet for pharmaceuticals.
3. Identify pharmaceutical supplies with expiration dates.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME_____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to store pharmaceutical supplies.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Assembled pharmaceutical supplies to be stored.	______	______
2.	Obtained key to pharmaceutical supply cabinet and opened the cabinet.	______	______
3.	Placed pharmaceutical supplies in their identified storage area in the supply cabinet.	______	______
4.	Identified and disposed of expired pharmaceutical supplies.	______	______
5.	Recorded total amount of each supply on in-cabinet inventory sheet.	______	______
6.	Locked pharmaceutical supply cabinet and returned key to authorized person.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 22

TASK: Store non-drug materials/supplies.

STANDARD OF PERFORMANCE OF TASK:

Non-drug materials/supplies must be assembled and stored in a predetermined accessible supply cabinet or storage room.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Storage area
Supply cabinet
Supplies to be stored
Inventory sheet

ENABLING OBJECTIVES:

1. Recall types of materials/supplies that are classified as non-drug.
2. Identify types of non-drug material/supplies used by department and how often they are to be inventoried.
3. Identify storage areas for storing non-drug materials.
4. Review established department procedure for storing non-drug material/supplies.

***RESOURCES:**

1. Department policy/procedure manual.
2. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
3. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
4. Supply cabinet.
5. Non-drug materials.
6. Inventory record sheets.
7. Checklist - Storing non-drug materials/supplies.

TEACHING ACTIVITIES:

1. Review department procedure regarding storage of non-drug materials/supplies and how often they are inventoried.
2. Conduct class discussion on types of non-drug materials/supplies used. (* 1,2 & 3)
3. Assemble non-drug materials/supplies to be stored. (* 5)
4. Identify and show students storage location of materials/supplies emphasizing supplies needing refrigeration and protection from moisture, heat, light, dust and radiation.
5. Explain procedures used for recording supply amounts on inventory record sheet and for filing inventory record sheets. (* 1 & 6)
6. Show students how to record supply amounts on inventory sheets and where to file inventory record sheets. (* 1 & 6)
7. Assign students to practice storing non-drug materials/supplies and completing inventory records sheets. (* 4,5 & 6)
8. Supervise and evaluate students storing non-drug materials/supplies and completing inventory record sheets. (* 7)

CRITERION-REFERENCED MEASURE:

The student must assemble non-drug materials/supplies to be stored, store non-drug materials/supplies in supply storage area, complete non-drug inventory sheets and file inventory sheets in records.

PERFORMANCE GUIDE:

1. Assemble non-drug materials/supplies to be stored.
2. Identify storage location for each non-drug material/supply.
3. Place material/supply in identified storage area.
4. Record supply amounts on inventory record sheet.
5. File inventory record sheet.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Store non-drug materials/supplies.

ENABLER

1. Recall types of materials/supplies that are classified as non-drug.
2. Locate cabinet for storing non-drug materials.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to store non-drug materials/supplies.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Assembled non-drug materials/supplies to be stored.	______	______
2.	Identified storage location for each non-drug material/supply.	______	______
3.	Placed material/supply in identified storage area.	______	______
4.	Recorded supply amounts on inventory record sheet.	______	______
5.	Filed inventory record sheet.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 23

TASK: Maintain inventory of radionuclides.

STANDARD OF PERFORMANCE OF TASK:

Activity levels and half-life time span for each substance on hand must be known within 10%. Radionuclides substances must be ordered so as to be available when needed, and radiation exposure must be in accordance with ALARA guidelines.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Prepared eluates
Radiopharmacy supply room
Compounded radiopharmaceuticals
Radionuclide generators
Radioactive decay charts
Shielding and protective attire
Precalibrated dose calibrator

ENABLING OBJECTIVES:

1. Identify radionuclides supply room.
2. Identify types of radionuclides.
3. Locate radioactive decay charts.
4. Locate radionuclides inventory sheets.
5. Review established department policy/procedure for maintaining inventory of radionuclides.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
5. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
6. Radiopharmaceutical supply room and supplies.
7. Radioactive information labels.
8. Radionuclides inventory sheets.
9. Radiopharmaceutical order form.
10. Checklist - Maintaining radionuclides inventory.

TEACHING ACTIVITIES:

1. Review how to review daily shedule for procedures. (* 1)
2. Explain and show students how to determine the quantity of pre-prepared radiopharmaceuticals on hand. (* 2,3,4 & 5)
3. Demonstrate how to assay pre-prepared radiopharmaceutical. (* 2 & 3)
4. Review procedure for labeling radiopharmaceutical with time and actual activity. (* 1,2 & 3)
5. Explain and demonstrate how to calculate available activity using dose calibrator eluted from the radionuclide generator. (* 2,3 & 5)
6. Show students how to record and label radionuclide with time/date and measured activity. (* 6 & 7)
7. Show students how to complete radiopharmaceutical order forms. (* 8 & 9)
8. Discuss how to identify vendors of radionuclides.
9. Explain how to inspect shipments of radionuclides and fill out receiving form. (* 2,3,4 & 5)
10. Review procedure to complete radionuclides inventory records. (* 6 & 8)
11. Monitor students as they practice maintaining inventory of radionuclides. (* 6,7,8 & 9)
12. Supervise and evaluate students as they maintain inventory of radionuclides. (* 10)

CRITERION-REFERENCED MEASURE:

The student must review scheduled procedures, count quantity of radiopharmaceuticals on hand, assay radiopharmaceuticals, complete label for radiopharmaceuticals, complete radionuclides inventory sheets, and complete radiopharmaceutical order forms for low supply items.

PERFORMANCE GUIDE:

1. Review daily schedule for procedures.
2. Determine quantity of pre-prepared radiopharmaceuticals on hand.
3. Assay pre-prepared radiopharmaceuticals, using dose calibrator record.
4. Label with time and actual activity for radiophamaceutical.
5. Calculate available activity using dose calibrator eluted from the radionuclide generator.
6. Record and label with time/date and measure activity.
7. Complete radiopharmaceutical order forms.
8. Identify vendors for purchasing radionuclides.
9. Receive/inspect shipments of radionuclides and fill out receiving form.
10. Complete radionuclides inventory records.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Maintain inventory of radionuclides.

ENABLER

1. Identify radionuclides supply room.
2. Recall types of radionuclides.
3. Locate radionuclides inventory sheets.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to maintain inventory of radionuclides.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Reviewed daily schedule for procedures.	_______	_______
2.	Determined quantity of pre-prepared radiopharmaceuticals on hand.	_______	_______
3.	Assayed pre-prepared radiopharmaceuticals, using dose calibrator record.	_______	_______
4.	Labeled with time and actual activity for radiophamaceutical.	_______	_______
5.	Calculated available activity using dose calibrator eluted from the radionuclide generator.	_______	_______
6.	Recorded and labeled with time/date and measured activity.	_______	_______
7.	Identified radionuclide vendor and completed radiopharmaceutical order forms.	_______	_______
8.	Received/inspected shipments of radionuclides and filled out receiving form.	_______	_______
9.	Completed radionuclides inventory records.	_______	_______

DUTY: PERFORMING ADMINISTRATION AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 24

TASK: Store radioactive material/supplies.

STANDARD OF PERFORMANCE OF TASK:

All radioactive material and supplies must be stored in accordance with state and federal rules and regulations governing the specific radioactive groups in compliance with ALARA standards.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Shielding
Survey meters
Inventory records
Shipping/receipt documents
Local/state/federal regulations

ENABLING OBJECTIVES:

1. Identify type of radioactive materials/supplies to be stored.
2. Recall ALARA concept.
3. Locate radioactive material supply room.
4. Recall local/state/federal storage regulations.
5. Locate radioactive material inventory records.
6. Review established department policy/procedure for storing radioactive materials/supplies.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.

***RESOURCES:** (cont.)

5. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
6. Local/state/federal regulations.
7. Radiation inventory records.
8. Checklist - Storing radioactive materials/supplies.

TEACHING ACTIVITIES:

1. Review procedure for inspecting and maintaining inventory supplies in accordance with request records and shipping documents. (* 1,2,3,4 & 7)
2. Review local, state and federal regulations regarding shipment of radioactive material/ supplies. (* 1 & 7)
3. Explain and demonstrate wipe tests according to receipt procedure. (* 2,3 & 6)
4. Identify proper storage area for radioactive materials/supplies. (* 1,2,3,4 & 5)
5. Explain and show students how to update inventory records. (* 2,3 & 8)
6. Review federal/state regulations concerning monitoring items during required storage. (* 7)
7. Monitor students as they practice storing radioactive material/supplies. (* 7 & 8)
8. Supervise and evaluate students storing radioactive material/supplies. (* 9)

CRITERION-REFERENCED MEASURE:

The student must inspect the supplies, complete inventory sheets, store the radioactive supplies in an approved area, and file the completed radiation inventory records in accordance with federal/ state/local regulations.

PERFORMANCE GUIDE:

1. Inspect and inventory supplies for accuracy in accordance with request records and shipping documents.
2. Survey shipments in accordance with local, state and federal regulations.
3. Perform necessary wipe tests per receipt procedure.
4. Store radioactive materials/supplies in approved shielded area in accordance with state and federal regulations.

PERFORMANCE GUIDE: (cont.)

5. Update inventory records as required.
6. Monitor items per federal/state regulations during required storage.
7. Notify appropriate department personnel of incoming or outgoing radioactive materials.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Store radioactive material/supplies.

ENABLER

1. Identify type of radioactive materials/supplies to be stored.
2. Locate radioactive material supply room.
3. Recall local/state/federal storage regulations.
4. Locate radioactive material inventory records.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to store radioactive material/supplies.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Inspected and inventoried supplies for accuracy in accordance with request records and shipping documents.	____	____
2.	Surveyed shipments in accordance with state and federal regulations.	____	____
3.	Performed necessary wipe tests per receipt procedure.	____	____
4.	Stored radioactive materials/supplies in approved shielded area in accordance with state and federal regulations.	____	____
5.	Updated inventory records as required.	____	____
6.	Monitored items per federal/state regulations during required storage.	____	____
7.	Notified appropriate department personnel of incoming or outgoing radioactive materials.	____	____

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 25

TASK: Prepare equipment purchase request.

STANDARD OF PERFORMANCE OF TASK:

Equipment purchase request must be completed including vendor name and address, equipment name and description, order numbers, unit price, trade-in/rebate discounts, sales tax and authorization signature. Completed purchase request must be submitted to purchasing department.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Calculator
Pen/pencil
Vendor catalogs
Purchase requisitions

ENABLING OBJECTIVES:

1. Identify equipment to be requested.
2. Identify possible equipment vendors.
3. Review established department policy/procedure for preparing equipment purchase request.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Vendor catalogs.
5. Purchase requisitions.
6. Checklist - Preparing equipment purchase request.

TEACHING ACTIVITIES:

1. Review department procedure concerning equipment purchase requests. (* 1)
2. Explain and show students how to identify equipment to be purchased in vendor catalogs. (* 4)
3. Identify or conduct class discussion on type of information needed to order equipment - i.e. vendor name and address, equipment name and description, equipment order numbers, trade-in/rebate discounts, sales tax, authorization signature. (* 1,2 & 3)
4. Demonstrate how to fill in purchase requisition. (* 4 & 5)
5. Explain how to verify purchase requisition for correct information. (* 1 & 5)
6. Identify procedure for submitting purchase request to purchasing department. (* 1)
7. Monitor students as they practice preparing equipment purchase requests. (* 4 & 5)
8. Supervise and evaluate students preparing equipment purchase requests. (* 6)

CRITERION-REFERENCED MEASURE:

The student must identify vendor for equipment, complete a purchase requisition, verify purchase requisition, and submit purchase request to purchasing department.

PERFORMANCE GUIDE:

1. Identify equipment to be purchased from vendor catalogs.
2. Obtain purchase requisitions and fill in purchase information.
    A. Vendor name and address.
    B. Equipment name and description.
    C. Equipment order numbers.
    D. Trade-in/rebate discounts.
    E. Sale tax.
    F. Authorization signature.
3. Verify purchase requisition for correct information.
4. Submit purchase request to purchasing department.

CHECKLIST

DUTY Performing Administrative and Cle

TASK Preparing equipment purchase requ

ENABLER

1. Recall equipment to be reques
2. Identify possible equipment v

STUDENT'S NAME________________________

EVALUATOR'S NAME________________________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist t
ability to prepare equipment

PERFORMANCE DETERMINANTS

1. Identified equipment to be purchas from vendor catalogs.
2. Obtained purchase requisitions and filled in purchase information.
3. Filled in vendor name and address.
4. Filled in equipment name and description.
5. Filled in equipment order numbers.
6. Obtained trade-in/rebate discounts
7. Obtained sale tax.
8. Filled in authorization signature.
9. Verified purchase requisition for correct information.
10. Submitted purchase request to purchasing department.

HECKLIST

tive and Clerical Functions

urchase request.

to be requested.
equipment vendors.

DATE__________

COURSE__________

:

checklist to evaluate a student's
e equipment purchase request.

MINANTS	**YES**	**NO**
o be purchased		
isitions and ormation.		
and address.		
me and		
der numbers.		
te discounts.		
n signature.		
isition for		
uest to		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 26

TASK: Maintain equipment inventory.

STANDARD OF PERFORMANCE OF TASK:

Equipment inventory must identify the equipment by name, model/serial number and description and must determine equipment physical count, equipment age, monetary value and remaining period of usefulness.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Pen/pencil
Inventory record
Equipment to be inventoried

ENABLING OBJECTIVES:

1. Identify equipment location.
2. Locate equipment inventory sheets.
3. Locate equipment disposal records for equipment still on inventory.
4. Review established department procedure for maintaining equipment inventory.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Equipment inventory sheets.
6. List of equipment to be inventoried.
7. Equipment to be inventoried.
8. Checklist - Maintaining equipment inventory.

TEACHING ACTIVITIES:

1. Review department procedures for maintaining equipment inventory. (* 1)
2. Explain how to identify and locate equipment to be inventoried. (* 1,4 & 6)
3. Explain and show students how to find equipment identification information - i.e. equipment name, model/serial number, and equipment description. (* 1,2,3,4 & 7)
4. Conduct class discussion on equipment inventory information - i.e. physical count, equipment age, monetary value, remaining life. (* 1,2,3 & 4)
5. Demonstrate to students how to record equipment inventory information on inventory sheets. (* 5)
6. Explain procedure to follow if equipment is outdated or remaining life is near expiration. (* 1,2, & 4)
7. Review procedure and show students how to file inventory sheets. (* 5)
8. Monitor students as they practice maintaining equipment inventory. (* 5,6 & 7)
9. Supervise and evaluate students performing equipment inventory. (* 8)

CRITERION-REFERENCED MEASURE:

The student must locate equipment to be inventoried, locate equipment identification information, record equipment inventory information on inventory sheets and file inventory sheet.

PERFORMANCE GUIDE:

1. Determine equipment to be inventoried.
2. Obtain inventory record sheets and record equipment identification information:
    A. Equipment name.
    B. Model/serial number.
    C. Equipment description.
3. Record equipment inventory information:
    A. Physical count of equipment.
    B. Equipment's age.
    C. Monetary value.
    D. Remaining life (usefulness).
    NOTE: If the equipment is outdated or remaining life is near expiration, a purchase request for new equipment should be filed, or put in for new fiscal year.
4. File inventory sheet for future reference.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Maintain equipment inventory.

ENABLER

1. Recall equipment location.
2. Locate equipment inventory sheets.
3. Locate equipment disposal records.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to maintain equipment inventory.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Determined equipment to be inventoried.		
2.	Obtained inventory record sheets and recorded equipment identification information.		
3.	Recorded equipment name.		
4.	Recorded model/serial number.		
5.	Recorded equipment description.		
6.	Recorded equipment inventory information.		
7.	Recorded physical count of equipment.		
8.	Recorded equipment's age.		
9.	Recorded monetary value.		
10.	Recorded remaining life (usefulness).		
11.	Recorded file inventory sheets for future reference.		

PERFORMANCE OBJECTIVE NO. 27

TASK: Schedule transportation of patient to and from examination and treatment area.

STANDARD OF PERFORMANCE OF TASK:

Transportation must be arranged to and from examination/treatment area for all inpatients and all immobilized outpatients.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Examination/treatment schedule
Transportation schedule

ENABLING OBJECTIVES:

1. Identify technologists and transportation equipment that is available.
2. Review patient's condition.
3. Identify location of patient and where he/she will be transported to.
4. Review established department policy/procedure for scheduling transportation of patient to and from examination/treatment area.

***RESOURCES:**

1. Department policy/procedure manual.
2. Vanders, S., Thomas, J., Cutler, B., & Wheeler, H. (1987). Atlas of bedside procedures. Boston, MA: Little, Brown and Company.
3. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
5. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
6. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

7. Examination/treatment schedule.
8. Wheelchair/stretcher.
9. Checklist - Scheduling transportation of patient.

TEACHING ACTIVITIES:

1. Identify location of examination/treatment schedule and explain how to identify upcoming examination/treatment. (* 1,5 & 7)
2. Conduct class discussion on scheduling proper transportation procedures for inpatients, mobile outpatients and immobile outpatients. (* 1,2 & 3)
3. Explain to students how to contact nurse's station and arrange time to transport inpatient. (* 1)
4. Explain and show students how to meet outpatient and escort to examination/treatment room. (* 1,3 & 4)
5. Demonstrate use of wheelchair or stretcher for transporting immobile outpatient to examination/treatment room. (* 4,6 & 8)
6. Explain and demonstrate how to record transportation information on scheduling record. (* 1 & 7)
7. Monitor students as they practice scheduling transportation of patient to and from examination/treatment area. (* 7 & 8)
8. Supervise students as they schedule and transport patients to and from examination/treatment area. (* 9)

CRITERION-REFERENCED MEASURE:

The student must determine patient's status, identify examination/treatment, identify location of examination/treatment and enter transportation information.

PERFORMANCE GUIDE:

1. Obtain examination/treatment schedule and identify upcoming examination/treatment.
2. Determine patient's status and arrange for patient transportation according to status.
   A. Inpatient:
      1. Contact nurse's station and have orderly transport or tell station when you will be getting the patient.

PERFORMANCE GUIDE: (cont.)

2. Determine patient's status and arrange for patient transportation according to status. (cont.)
   - B. Outpatient (mobile):
     1. Technologist meets patient at waiting room and escorts him/her to examination/ treatment room.
   - C. Outpatient (immobile):
     1. Technologist meets patient at waiting area with wheelchair or stretcher.
3. Record transportation information on scheduling record.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Schedule transportation of patient to and from examination and treatment area.

ENABLER

1. Recall technologists and transportation equipment that is available.
2. Review patient's condition.
3. Identify location of patient and where he/she will be transported to.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to schedule transportation of patient to and from examination and treatment area.

PERFORMANCE DETERMINANTS	YES	NO
1. Obtained examination/treatment schedule and identified upcoming examination/treatment.	______	______
2. Determined patient's status and arranged for patient transportation according to status.	______	______
3. Inpatient: Contacted nurse's station and had orderly transport or told station when you would get the patient.	______	______
4. Outpatient (mobile): Technologist met patient at waiting room and escorted him/her to examination/ treatment room.	______	______
5. Outpatient (immobile): Technologist met patient at waiting area with wheelchair or stretcher.	______	______
6. Recorded transportation information on scheduling record.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 28

TASK: Chart patient's medical history.

STANDARD OF PERFORMANCE OF TASK:

Patient's medical history must be recorded on the patient's chart including: patient's name, address, age, identification number, physician's name, allergies, past medical problems and special procedure preparations. Recording technologist must sign and date entry.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient
Patient chart
Pen/pencil

ENABLING OBJECTIVES:

1. Identify medical information needed for patient chart.
2. Locate patient chart forms.
3. Review inpatient and outpatient procedures.
4. Review established department procedure for charting a patient's medical history.

***RESOURCES:**

1. Department policy/procedure manual.
2. Caroline, N. (1987). Emergency medical treatment. Boston, MA: Little, Brown and Company.
3. Eckert, C. (1981). Emergency-room care (4th ed.). Boston, MA: Little, Brown and Company.
4. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
5. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

6. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
7. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
8. Caughill, R. (1976). The dying patient: A supportive approach. Boston, MA: Little, Brown and Company.
9. Patient chart forms.
10. Patient's file.
11. Checklist - Charting patient's medical history.

TEACHING ACTIVITIES:

1. Discuss procedure for locating blank patient medical forms needed. (* 1,5 & 7)
2. Conduct class discussion on necessary aspects of patient's medical history, including name, address, age, identification number, physician's name, allergies and past medical problems. (* 1,2,3,5 & 6)
3. Demonstrate methods for explaining to patient why you need his/her medical history information and what you are going to do to obtain it. (* 1,4, & 8)
4. Explain and show students how to record patient's medical history information on patient's chart. (* 2,3,6,7 & 9)
5. Stress to students the importance of signing and dating entry. (* 1,5,7 & 9)
6. Review and demonstrate proper filing procedure for patient's chart. (* 5,7,9 & 10)
7. Monitor students as they practice obtaining and recording patient medical history information. (* 9 & 10)
8. Supervise and evaluate students charting patient medical history information. (* 11)

CRITERION-REFERENCED MEASURE:

The student must explain process to patient, question patient on his/her medical history, record information on patient chart forms, sign and date entry and place chart forms in patient's file.

PERFORMANCE GUIDE:

1. Obtain medical history chart form.
2. Greet patient and explain purpose of chart.
3. Obtain patient's medical history information:
    - A. Name and address.
    - B. Age.
    - C. Identification number.
    - D. Physician's name.
    - E. Allergies or past medical problems.
4. Record patient's medical history information on patient's chart.
5. File patient's chart for future use.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Chart patient's medical history.

ENABLER

1. Identify medical information needed for patient chart.
2. Locate patient chart forms.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to chart patient's medical history.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained medical history chart form.	______	______
2.	Greeted patient and explained purpose of chart.	______	______
3.	Obtained patient's medical history information: name and address, age, identification number, physician's name, allergies or past medical problems.	______	______
4.	Recorded patient's medical history information on patient's chart.	______	______
5.	Signed and dated entry.	______	______
6.	Filed patient's chart for future use.	______	______

DUTY: PERFORMING ADMINISTRATIVE & CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 29

TASK: Check for signed permission forms.

STANDARD OF PERFORMANCE OF TASK:

Patient's chart must contain permit forms that have been signed and dated by both the patient and witness.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Permission form

ENABLING OBJECTIVES:

1. Recall importance of permission forms being signed prior to procedure.
2. Recall contents of permission form.
3. Review established department policy/procedure for checking for signed permission forms.

***RESOURCES:**

1. Department policy/procedure.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
5. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
6. Patient's chart.
7. Permission form.
8. Checklist - Checking for signed permission forms.

TEACHING ACTIVITIES:

1. Review department procedures regarding permission forms.(* 1)
2. Discuss method for identifying the location of patient's chart. (* 1,4 & 5)
3. Show students how to locate permit form in patient's chart and check for signatures (patient/guardian and witness) and date. (* 6 & 7)
4. Stress the need to check permission form prior to tests/therapy. (* 1,2,3,4 & 5)
5. Explain procedure to follow if form has not been signed. (* 1,2,3 & 5)
6. Demonstrate how to obtain signatures on permit form. (* 1 & 7)
7. Show students how to return chart to storage area. (* 1 & 6)
8. Monitor students as they practice checking permission forms and obtaining signatures on permission forms. (* 6 & 7)
9. Supervise and evaluate students checking permission forms and obtaining signatures on permission forms if necessary. (* 8)

CRITERION-REFERENCED MEASURE:

The student must get patient's chart, find permission form, verify patient and witness signatures, obtain patient's signature prior to procedure if not signed and return chart to storage area.

PERFORMANCE GUIDE:

1. Obtain patient's chart.
2. Locate permit form in patient's chart.
3. Check to see if patient/guardian and witness have signed and dated permit form.
   CAUTION: Always check permit form prior to performing examination or therapy. Advise supervisor if permit form has not been signed.
4. Obtain signature's on permit form if possible.
5. Return chart to storage area.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Check for signed permission forms.

ENABLER

1. Recall importance of permission forms being signed prior to procedure.
2. Recall contents of permission form.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to check for signed permission forms.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained patient's chart.	______	______
2.	Located permit from in patient's chart.	______	______
3.	Checked to see if patient/guardian and witness had signed and dated permit form.	______	______
4.	Obtained signature on permit form if possible.	______	______
5.	Returned chart to storage area.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 30

TASK: Check patient's pre-imaging preparations.

STANDARD OF PERFORMANCE OF TASK:

Pre-imaging preparations including, catheterization, enemas, filling bladder, administering contrast media and scout films must be completed prior to requested examination.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient identification
Patient's chart
Physician's request
Institution's prep protocol

ENABLING OBJECTIVES:

1. Recall types of pre-imaging procedures.
2. Identify procedure to be prepared for.
3. Review established department policy/procedures for checking patient's pre-imaging preparations.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
4. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
5. Physician's request.
6. Patient's chart.
7. Checklist - Checking patient's pre-imaging preparations.

TEACHING ACTIVITIES:

1. Explain and show students how to verify physician's request. (* 1 & 5)
2. Review procedure for verifying patient identification. (* 1,3 & 4)
3. Demonstrate how to establish rapport and verify patient identification. (* 1 & 6)
4. Explain and show students how to verify per patient or patient's chart that adequate pre-imaging prep was performed. (* 1,2,3,4 & 6)
5. Conduct class discussion on possible pre-imaging preparations, i.e. catheterization, enemas, filling bladder, administering contrast media, scout films. (* 1,3 & 4)
6. Review procedure to follow if all pre-imaging preparations have not been done. (* 1)
7. Monitor students as they practice checking patient's pre-imaging preparations. (* 5 & 6)
8. Supervise and evaluate students checking patient's pre-imaging preparations. (* 7)

CRITERION-REFERENCED MEASURE:

The student must verify physician's request and patient's identification, check patient's chart for pre-imaging prep, and complete any pre-imaging preparations not done.

PERFORMANCE GUIDE:

1. Verify physician's request.
   NOTE: Determine that exam was not ordered with no-prep per physician and identify pre-imaging preparations ordered.
2. Greet patient and verify patient's identification.
3. Verify per patient or patient's chart that adequate pre-imaging patient prep was performed.
   NOTE: Institutional protocol may require a "scout" film to assure bowel is sufficiently evacuated of feces to assure an optimum study.
4. Continue with exam if all pre-imaging preparations are complete.
   NOTE: If all requested pre-imaging preparations have not been done, the technologist should complete them or order them to be completed.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Check patient's pre-imaging preparations.

ENABLER

1. Recall types of pre-imaging procedures.
2. Identify procedure to be prepared for.

STUDENT'S NAME________________________________**DATE**__________

EVALUATOR'S NAME_____________________________**COURSE**_________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to check patient's pre-imaging preparations.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's request.		
2.	Greeted patient and verified patient's identification.		
3.	Verified per patient or patient's chart that adequate pre-imaging patient prep was performed.		
4.	Continued with exam if all pre-imaging preparations were complete.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 31

TASK: Consult with referring physician regarding patient's medical history and examination procedures.

STANDARD OF PERFORMANCE OF TASK:

Patient's medical information/history and planned examination/therapy procedures must be discussed with referring physician prior to the administration of exams or therapy.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Viewbox
Patient's chart
Requesting physician
Physician's orders
Patient's medical records

ENABLING OBJECTIVES:

1. Identify referring physician.
2. Review department protocol for requesting exams/therapy.
3. Review established department procedure for consulting with referring physician.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Patient's chart.
5. Patient's medical records.
6. Viewbox.
7. Checklist - Consulting with referring physician.

TEACHING ACTIVITIES:

1. Explain procedure to arrange meeting time with physician. (* 1)
2. Conduct class discussion on medical information needed for meeting. (* 1,2 & 3)
3. Show students how to locate and assemble medical information i.e. patient's chart, patient's medical records, physician's orders/requests. (* 4 & 5)
4. Demonstrate how to view radiograph and note points of interest. (* 1 & 6)
5. Conduct class discussion on past medical history which many affect examination/treatment. (* 1,4 & 5)
6. Discuss identifying current symptoms/conditions that should be brought to physician's attention. (* 4 & 5)
7. Demonstrate/stimulate discussion with physician for planned examination/procedure. (* 4,5 & 6)
8. Explain and demonstrate procedure for recording pertinent patient information on patient's chart. (* 4)
9. Monitor students as they practice consulting with referring physician. (* 4,5 & 6)
10. Supervise and evaluate students consulting with referring physician. (* 7)

CRITERION-REFERENCED MEASURE:

The student must arrange a meeting with the referring physician, gather patient's medical records, review medical information with physician and record pertinent information on patient's chart.

PERFORMANCE GUIDE:

1. Arrange meeting time with referring physician.
2. Assemble medical information:
   A. Patient's chart.
   B. Patient's medical records.
   C. Physician's orders/request.
3. Review medical information with requesting physician:
   A. View radiograph and note points of interest.

PERFORMANCE GUIDE: (cont.)

  - B. Discuss past medical history which may affect procedure:
    - 1. Medication.
    - 2. Allergies.
    - 3. Past exam results.
    - 4. Current symptoms.
    - 5. Alert conditions:
      - a. High blood pressure.
      - b. Weak heart.
      - c. Diabetic.
      - d. Thin blood.
  - C. Discuss planned examination/treatment procedure with physician.
- 4. Record pertinent patient information on patient's chart.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Consult with referring physician regarding patient's medical history and examination procedures.

ENABLER

1. Identify referring physician.
2. Review department protocol requesting exam/therapy.

STUDENT'S NAME____________________**DATE**________

EVALUATOR'S NAME____________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to consult with referring physician regarding patient's medical history and examination procedures.

PERFORMANCE DETERMINANTS	YES	NO
1. Arranged meeting time with referring physician.	______	______
2. Assembled medical information:		
- Patient's chart.	______	______
- Patient's medical records.	______	______
- Physician's orders/request.	______	______
3. Reviewed medical information with referring physician:		
- Viewed radiograph and note points of interest.	______	______
- Discussed past medical history which may affect procedure.	______	______
- Discussed planned examination/ treatment procedure with physician.	______	______
4. Recorded pertinent patient information on patient's chart.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 32

TASK: Complete patient identification on labels or forms.

STANDARD OF PERFORMANCE OF TASK:

Patient identification must be entered on identification labels or forms. Patient identification information must include: patient's name, address, identification number, age/birthdate, and physician's name.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Labels
Forms
Typewriter
Patient chart

ENABLING OBJECTIVES:

1. Locate patient identification label.
2. Recall patient information for identification label.
3. Review established department procedure for completing patient identification on labels.

***RESOURCES:**

1. Department policy/procedure manual.
2 Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Ballinger P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.

***RESOURCES:** (cont.)

5. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
6. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
7. Identification labels/forms.
8. Patient's chart.
9. Checklist - Completing patient identification on forms or labels.

TEACHING ACTIVITIES:

1. Review patient identification information that must be entered on identification labels or forms, i.e. patient's name, address, identification number, age/birthdate, physician's name, exam being performed. (* 1,2,3,5,6 & 8)
2. Identify location of patient's chart and labels or forms to be completed. (* 1)
3. Demonstrate how to insert form into typewriter and type patient identification information on form or label. (* 7)
4. Show students how to adhere label to object to be identified. (* 7)
5. Discuss procedure for specifying location or personnel that receives form. (* 1)
6. Monitor students as they practice completing patient identification labels or forms. (* 7 & 8)
7. Supervise and evaluate students as they complete patient identification labels or forms. (* 9)

CRITERION-REFERENCED MEASURE:

The student must secure forms or labels, enter patient's identification information and adhere the label to object being identified.

PERFORMANCE GUIDE:

1. Obtain patient's chart and labels or forms to be completed.
2. Insert labels or form into typewriter and align.
3. Turn on typewriter and enter patient identification information.
   A. Patient's name.
   B. Address.
   C. Identification number.
   D. Patient's age/birthdate.

PERFORMANCE GUIDE: (cont.)

3. Turn on typewriter and enter patient identification information. (cont.)
   E. Physician's name.
   F. Exam being performed.
4. Adhere label to object to be identified.
5. Give form to proper personnel for completion.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Complete patient identification on labels or forms.

ENABLER

1. Locate patient identification label.
2. Recall patient information for identification label.

STUDENT'S NAME________________________________ **DATE**____________

EVALUATOR'S NAME______________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to complete patient identification on labels or forms.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained patient's chart and labels or forms to be completed.	______	______
2.	Inserted labels or form into typewriter and aligned.	______	______
3.	Turned on typewriter and entered patient identification information.	______	______
4.	Adhered label to object to be identified.	______	______
5.	Gave form to proper personnel for completion.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 33

TASK: Update patient's records.

STANDARD OF PERFORMANCE OF TASK:

Patient's records must contain most recent identification information, medical history, exam results, and physician's diagnosis/treatment as soon as information is available for recording.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Patient's medical records

ENABLING OBJECTIVES:

1. Identify patient records to be updated.
2. Recall how to identify patient's chart.
3. Review established department procedure for filing patient's record.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Patient's medical charts.
5. Patient chart.
6. Checklist - Updating patient's charts.

TEACHING ACTIVITIES:

1. Review department procedure regarding updating of patient's records. (* 1)
2. Identify location of patient's charts and medical records. (* 1)

TEACHING ACTIVITIES:

3. Discuss types of new patient information that is added to patient's records (patient identification information, medical history, exam results). (* 1,2 & 3)
4. Explain and demonstrate how to record updated information in patient's medical records. (* 2,3,4 & 5)
5. Monitor students while they practice updating patient's records. (* 4 & 5)
6. Supervise and evaluate students updating patient's records. (* 6)

CRITERION-REFERENCED MEASURE:

The student must get patient's chart, identify new patient information, and record new information on patient's chart.

PERFORMANCE GUIDE:

1. Obtain patient's chart and medical records.
2. Identify new patient information to be recorded:
   - A. Patient identification information:
     1. Name.
     2. Address.
     3. Identification number.
     4. Patient's age/birthdate.
     5. Physician's name.
     6. Medical insurance company.
   - B. Medical history:
     1. Allergies.
     2. Past exams/treatment.
     3. Past diagnosis.
     4. Family medical history.
     5. Medical alerts.
   - C. Exam results:
     1. Exam results.
     2. Physician's diagnosis.
     3. Planned treatment.
3. Record update information in patient's medical records.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Update patient's records.

ENABLER

1. Identify patient records to be updated.
2. Recall how to identify patient's chart.
3. Review established department procedure for filing patient's record.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to update a patient's records.

PERFORMANCE DETERMINANTS	YES	NO
1. Obtained patient's chart and medical records.	_______	_______
2. Identified patient's identification information to be recorded.	_______	_______
3. Identified patient's medical history.	_______	_______
4. Identified patient's exam results.	_______	_______
3. Recorded update information in patient's medical records.	_______	_______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 34

TASK: File patient's records.

STANDARD OF PERFORMANCE OF TASK:

Patient's records must be filed in the designated location according to the hospital's established filing method. Patient's files must be accessible at all times.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

File cabinet
Patient's record
Patient identification label

ENABLING OBJECTIVES:

1. Identify designated location for filing patient's charts.
2. Identify filing method used for patient's charts.
3. Review established department procedure for filing patient's charts.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Patient's records.
5. Identification labels.
6. Filing cabinets.
7. Checklist - Filing patient's records.

TEACHING ACTIVITIES:

1. Discuss procedure for identifying location of patient's file. (* 1)

TEACHING ACTIVITIES: (cont.)

2. Explain and show how to verify that file has been updated and that patient identification label on record cover has been updated. (* 1,2 & 3)
3. Demonstrate procedure to update patient identification label. (* 4 & 5)
4. Explain filing system being used. (* 1,2 & 3)
5. Identify file location and show students how to find file in filing cabinet stressing the importance of locating missing files. (* 4 & 6)
6. Demonstrate how to return patient's record to appropriate file location. (* 4 & 6)
7. Show students how to verify correct file location. (* 4 & 6)
8. Monitor students as they practice filing patient's records.
9. Supervise and evaluate students filing patient's records. (* 7)

CRITERION-REFERENCED MEASURE:

The student must locate the patient's updated file, verify the identification label on record's cover, update identification label if necessary, and file the patient's record in the established file location.

PERFORMANCE GUIDE:

1. Obtain patient's file and verify that it has been updated.
2. Verify that patient identification label on record cover is updated.
   NOTE: If identification label on patient record is not current, create new label and place on the file cover before filing.
3. Identify filing system being used and file location.
4. Locate patient's file location in the filing cabinet.
5. Place patient's record in appropriate file location in the filing cabinet.
6. Verify correct file location and close filing cabinet.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK File patient's records.

ENABLER

1. Identify designated location for filing patient's charts.
2. Recall filing method used for patient's charts.
3. Review established department procedure for filing patient's charts.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to file patient's records.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Obtained patient's file and verified that it has been updated.	______	______
2. Verified that patient identification label on record cover is updated.	______	______
3. Identified filing system being used and file location.	______	______
4. Located patient's file location in the filing cabinet.	______	______
5. Placed patient's record in appropriate file location in the filing cabinet.	______	______
6. Verified correct file location and closed filing cabinet.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 35

TASK: Maintain radiologic master card file.

STANDARD OF PERFORMANCE OF TASK:

Radiologic master card file must provide information on all radiologic exams performed including patient's name, patient's identification number, patient's age/birthdate, exam name, examination date, x-ray file number, physician's name, and technologist who performed the exam.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Pen/pencil
Master cards
Master card files
Patient's chart

ENABLING OBJECTIVES:

1. Recall purpose of radiologic master card file.
2. Identify location of master card file.
3. Review established department policy/procedure for maintaining radiologic master card file.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
4. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
5. Master cards.
6. Master card files.
7. Patient's chart.
8. Checklist - Maintaining radiologic master card file.

TEACHING ACTIVITIES:

1. Review department procedure for creating/updating radiologic master card file. (* 1)
2. Explain and demonstrate procedure for creating a new patient's master card. (* 2,3,4 & 5)
3. Explain and show student how to locate and record update information on master card. (* 2,3,4 & 5)
4. Explain and demonstrate how to create a new master card to replace a lost or damaged card.
5. Show students how to verify that update information is correct. (* 5 & 7)
6. Explain master card filing system being used. (* 1)
7. Demonstrate filing master card. (* 5 & 6)
8. Monitor student as they practice updating radiologic master card files. (* 5,6 & 7)
9. Supervise and evaluate students updating and filing radiologic master card files. (* 8)

CRITERION-REFERENCED MEASURE:

The student must assemble patient medical information, create or update patient's master card file, verify recorded information, and file master card in master card file.

PERFORMANCE GUIDE:

1. Obtain patient's updated medical file.
2. Locate patient's master card.
   NOTE: If no master card exists, the technologist must create one. (See step 3 for required information.)
3. Remove master card and record update information:
   A. Patient's name and age/birthdate.
   B. Patient's identification number.
   C. Exam name and date.
   D. X-ray file number.
   E. Physician's name.
   F. Performing technologist.
4. Verify that update information is correct.
5. Place master card in correct location according to filing system used.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Maintain radiologic master card file.

ENABLER

1. Recall purpose of radiologic master card file.
2. Identify location of master card file.

STUDENT'S NAME____________________________**DATE**__________

EVALUATOR'S NAME__________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to maintain radiologic master card file.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained patient's updated medical file.	______	______
2.	Located patient's master card.	______	______
3.	Removed master card and recorded update information.	______	______
4.	Recorded patient's name and age/birthdate.	______	______
5.	Recorded patient's identification number.	______	______
6.	Recorded exam name and date.	______	______
7.	Recorded X-ray file number.	______	______
8.	Recorded physician's name.	______	______
9.	Recorded performing technologist.	______	______
10.	Verified that updated information was correct.	______	______
11.	Placed master card in correct location according to filing system used.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 36

TASK: Maintain report and film file.

STANDARD OF PERFORMANCE OF TASK:

A record of a patient's diagnostic study(s), request(s), interpretation(s), and copies of the imaging media will be maintained on file in accordance with state, federal, and department rules and regulations.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Request(s)
Imaging media(s)
Filing/index system
Storage receptacle
Interpretive report(s)

ENABLING OBJECTIVES:

1. Identify state, federal and department rules and regulations.
2. Locate requests, imaging media and diagnosis to be stored.
3. Review established department policy/procedure for maintaining report and filing files.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
5. Reports and films.
6. Storage receptacle.
7. Federal, state, local rule and regulations.
8. Checklist - Maintaining report and film file.

TEACHING ACTIVITIES:

1. Review state, federal and department rules and regulations concerning report and film files. (* 1 & 7)
2. Discuss procedure for identifying location of copies of the request(s), imaging system media(s) and copy of the interpretation(s). (* 1,2 & 3)
3. Explain and demonstrate how to condense copies of the request(s), imaging system media(s) and copy of the interpretation(s) and insert in prescribed storage receptacles. (* 1,2,3,4 & 5)
4. Explain how to document the file contents in the approved location according to regulations. (* 2,3 & 4)
5. Show students how to document the file contents in the approved location following regulations. (* 5)
6. Review different types of indexing system used. (* 2,3 & 4)
7. Demonstrate how to insert the applicable patient/study data in the indexing system. (* 6)
8. Review and demonstrate proper filing procedure for completed record. (* 5 & 6)
9. Monitor students as they practice maintaining report and film files. (* 5,6 & 7)
10. Supervise and evaluate students maintaining report and film files. (* 8)

CRITERION-REFERENCED MEASURE:

The student must assemble reports and films to be stored, document the file contents, update indexing system and store the complete record in an approved location.

PERFORMANCE GUIDE:

1. Copies of the request(s), imaging system media(s), and a copy of the interpretation(s) will be summarized and inserted in the prescribed storage receptacle.
2. Document the file contents on approved forms, per the department, state,and federal regulations.
3. Insert the applicable patient and exam data in the indexing system.
4. File the completed record in accordance with approved guidelines.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Maintain report and film file.

ENABLER

1. Recall state, federal and department rules and regulations.
2. Locate requests, imaging media and diagnosis to be stored.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to maintain report and film file.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Summarized and inserted copies of the request imaging system media(s), and a copy of the interpretation(s) in the prescribed storage receptacle.	______	______
2. Documented the contents in or on the approved location.	______	______
3. Inserted the applicable patient and exam data in the indexing system.	______	______
4. Filed the completed record in accordance with approved guidelines.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 37

TASK: Maintain records of patient's radiation dosage.

STANDARD OF PERFORMANCE OF TASK:

Radiation dosage in number of RADS must be recorded on patient's treatment chart immediately after administration. Accumulated radiation dosage must be calculated and recorded on patient's chart after every treatment. Accumulated radiation dose must not exceed total planned dosage.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Pen/pencil
Calculator
Patient's chart
Radiation (RADS) counter
Patient's radiation treatment plan

ENABLING OBJECTIVES:

1. Recall the meaning of RADS.
2. Identify patient's planned radiation dosage.
3. Review established procedure for maintaining records of patient's radiation dosage.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

5. Whalen, J., & Balter, S. (1984). Radiation risks in medical imaging. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Patient's chart.
7. Radiation counter.
8. Radiation treatment plan.
9. Checklist - Maintaining patient's radiation dosage records.

TEACHING ACTIVITIES:

1. Conduct class discussion on the need for accurate records of patient's of accumulated radiation dosage. (* 1,2 & 3)
2. Discuss procedure for the location of patient's radiation treatment plan or patient's chart. (* 1)
3. Explain and show how to determine and record on the patient's chart the number of RADS administered immediately after treatment. (* 2,3,4,5,6 & 8)
4. Demonstrate how to calculate total accumulated radiation dose in RADS. (* 6 & 8)
5. Explain and show students how to record accumulated radiation dosage on patient's chart. (* 6 & 8)
6. Identify how to verify total planned radiation dosage and compare to accumulated dosage. (* 2,3,4,6 & 8)
7. Demonstrate how to verify total planned radiation dosage and compare to accumulated dosage. (* 1)
8. Explain and show students how to calculate.(* 9)
9. Instruct students on proper procedure to follow if next radiation treatment will take patient above planned dosage. (* 1,2 & 3)
10. Show students how to return patient's chart and treatment plan to their storage location. (* 1)
11. Monitor students as they practice maintaining records of patient's radiation dosage. (* 6,7 & 8)
12. Supervise and evaluate students maintaining records of patient's radiation dosage. (* 9)

CRITERION-REFERENCED MEASURE:

The student must locate patient's chart or treatment plan, record number of RAD's received, calculate accumulated dosage, record findings on patient's chart/treatment plan, calculate number of remaining treatments and file patient's chart/treatment plan.

PERFORMANCE GUIDE:

1. Obtain patient's radiation treatment plan and patient's chart.
2. Record number of RADS administered on patient's chart.
3. Calculate total accumulated radiation dose in RADS.
4. Record accumulated radiation dosage on patient's chart.
5. Verify total planned radiation dosage and compare to accumulated dosage.
6. Calculate the number of remaining treatments before planned radiation dosage is obtained.
   NOTE: If next radiation treatment will take patient above planned dosage, consult oncologist before administering.
7. Return patient's chart and treatment plan to their storage location.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Maintain records of patient's radiation dosage.

ENABLER

1. Recall the meaning of RADS.
2. Identify patient's planned radiation dosage.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to maintain records of patient's radiation dosage.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Obtained patient's radiation treatment plan and patient's chart.	______	______
2.	Recorded number of RADS administered on patient's chart.	______	______
3.	Calculated total accumulated radiation dose in RADS.	______	______
4.	Recorded accumulated radiation dosage on patient's chart.	______	______
5.	Verified total planned radiation dosage and compared to accumulated dosage.	______	______
6.	Calculated the number of remaining treatments before planned radiation dosage is obtained.	______	______
7.	Returned patient's chart and treatment plan to their storage location.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 38

TASK: File department records.

STANDARD OF PERFORMANCE OF TASK:

The items must be filed according to the established filing system. All items must be filed without error.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

File cabinet
File folders
Items to be filed

ENABLING OBJECTIVES:

1. Identify types of filing systems.
2. Gather department records to be filed.
3. Review established department procedure for filing department records.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. File folders.
5. File cabinet.
6. Department records.
7. Checklist - Filing department records.

TEACHING ACTIVITIES:

1. Conduct class discussion on possible systems of filing (i.e. alphabetical, numerical, color code.) (* 1,2 & 3)
2. Identify location of item to be filed. (* 6)

TEACHING ACTIVITIES: (cont.)

3. Explain to students how to separate items to be filed into groups (i.e. correspondence, publications, policies, regulations, miscellaneous) according to department practice. (* 1 & 6)
4. Demonstrate how to sort items into specified groups. (* 6)
5. Identify location of files and show students how to file items (* 4 & 5)
6. Monitor students as they practice filing department records. (* 4,5 & 6)
7. Supervise and evaluate students filing department records. (* 7)

CRITERION-REFERENCED MEASURE:

The student must locate items to be filed, determine type of filing system, separate items into groups, and place each group in the file.

PERFORMANCE GUIDE:

1. Determine the system of filing:
   A. Alphabetical.
   B. Numerical.
   C. Color code.
2. Separate the items to be filed into groups:
   A. Correspondence.
   B. Publications.
   C. Policies.
   D. Regulations.
   E. Miscellaneous other.
3. Locate the files needed for each group.
4. Place items into files.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK File department records.

ENABLER

1. Recall types of filing systems.
2. Gather department records to be filed.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME___________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to file department records.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Determined the system of filing.	______	______
2.	Separated the items to be filed into groups.	______	______
3.	Located the files needed for each group.	______	______
4.	Placed items into files.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 39

TASK: Determine examination charge and coding.

STANDARD OF PERFORMANCE OF TASK:

Exam coding and charge must be identified and entered on a charge slip. Charge slip must be sent to the accounting department for patient billing.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Charge slip
Pen/pencil
Patient's chart
Examination code/price list

ENABLING OBJECTIVES:

1. Locate examination code/price list.
2. Review established department policy/procedure for determining examination charge and code.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Patient's chart.
5. Charge slip.
6. Examination code/price list.
7. Checklist - Determining examination charge and coding.

TEACHING ACTIVITIES:

1. Identify location of patient's chart, examination code/price list and charge slips. (* 1)
2. Identify exams performed and show students how to determine exam code and price. (* 2,3 & 6)

TEACHING ACTIVITIES: (cont.)

3. Review billing procedure and discuss billing information that appears on charge slip i.e. patient's name, billing address, patient's identification number, physician's name, insurance company, examination code and prices, and dates of examinations. (* 2 & 3)
4. Show students how to record billing information on charge slip. (* 4,5 & 6)
5. Show students how to route charge slip to accounting department. (* 1 & 5)
6. Monitor students as they practice determining examination charge and coding. (* 4,5 & 6)
7. Supervise and evaluate students determining examination charge and coding. (* 7)

CRITERION-REFERENCED MEASURE:

The student must get the examination code/price list, identify exams performed, identify codes and prices, record billing information and send charge slip to accounting department.

PERFORMANCE GUIDE:

1. Obtain patient's chart, examination code/price list and charge slip.
2. Identify exams performed.
3. Determine exam code and price.
4. Record billing information on charge slip:
   A. Patient's name and billing address.
   B. Patient's identification number.
   C. Physician's name.
   D. Insurance company (if any).
   E. Examination codes and prices.
   F. Dates of examinations.
5. Route charge slip to accounting department.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Determine examination charge and coding.

ENABLER

1. Locate examination code/price list.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to determine examination charge and coding.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained patient's chart, examination code/price list and charge slip.	_______	_______
2.	Identified exams performed.	_______	_______
3.	Determined exam code and price.	_______	_______
4.	Recorded billing information on charge slip.	_______	_______
5.	Routed charge slip to accounting department.	_______	_______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 40

TASK: Conduct department meeting.

STANDARD OF PERFORMANCE OF TASK:

Department meeting must be conducted with staff technologists to exchange ideas, discuss problems, updates, and new products; keep abreast of what is going on in specialty areas and the radiologic technology occupations.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Agenda
Meeting place
Department technologists

ENABLING OBJECTIVES:

1. Recall purpose of meeting and people who should attend.
2. Recall contents of meeting agenda.
3. Identify meeting location.
4. Review established department procedure for conducting a department meeting.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Meeting agenda.
5. List of department personnel.
6. Meeting place.
7. Checklist - Conducting department meeting.

TEACHING ACTIVITIES:

1. Discuss proper procedure to arrange meeting time and place. (* 1 & 2)
2. Show students how to prepare meeting reminders. (* 1,2 & 3)
3. Conduct class discussion on preparing meeting agenda. (* 1,2 & 4)
4. Instruct students how to contact people who are to attend meeting. (* 2,3 & 5)
5. Stress importance of starting meeting promptly on time. (* 1,2 & 3)
6. Explain and demonstrate how to complete attendance sheet. (* 2 & 5)
7. Demonstrate how to keep minutes of meetings. (* 1,2 & 3)
8. Monitor students as they practice scheduling and conducting department meetings. (* 4,5 & 6)
9. Supervise and evaluate students' scheduling and conducting department meetings. (* 7)

CRITERION-REFERENCED MEASURE:

The student must arrange meeting time and place, contact department personnel who should attend meeting, prepare meeting agenda, take meeting attendance and keep a record of meeting proceedings.

PERFORMANCE GUIDE:

1. Arrange meeting time and place.
2. Post meeting reminders.
3. Prepare meeting agenda.
4. Contact people who are to attend meeting.
5. Hold meeting promptly at scheduled time and place convenient for most technologists.
6. Complete attendance sheet.
7. Keep minutes of meetings.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Conduct department meeting.

ENABLER

1. Recall purpose of meeting and people who should attend.
2. Recall contents of meeting agenda.
3. Identify meeting location.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct department meeting.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Arranged meeting time and place.		
2.	Posted meeting reminders.		
3.	Prepared meeting agenda.		
4.	Contacted people who were to attend meeting.		
5.	Held meeting promptly at scheduled time and place convenient for most technologists.		
6.	Completed attendance sheet.		
7.	Kept minutes of meeting.		

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 41

TASK: Supervise clinical experience of students.

STANDARD OF PERFORMANCE OF TASK:

Students must be under supervision at all times while at a clinical facility.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Student
Clinical setting
Clinical supervisor/instructor

ENABLING OBJECTIVES:

1. Identify radiologic accrediting agencies.
2. Review ASRT literature for clinical competency.
3. Review department protocol for supervising clinical experience of students.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L. and Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. American Society of Radiologic Technologists. (1985). Competency statements for radiography. Albuquerque, NM: Author.
5. Guest Speaker.
6. Sample clinical evaluation forms.
7. Checklist - Supervising clinical experience.

TEACHING ACTIVITIES:

1. Present lecture on purpose of radiologic student's clinical experience. (* 1,2 & 3)
2. Discuss mandatory governing agency regulations governing clinical experience. (* 3)

TEACHING ACTIVITIES: (cont.)

3. Explain staff member qualifications for supervising clinical experience. (* 1)
4. Demonstrate methods of clinical experience documentation. (* 5)
5. Conduct a class discussion on qualifications needed for national certification in radiologic fields. (* 1 & 3)
6. Introduce guest speaker to lecture on responsibility of clinical experience supervisor. (* 4)
7. Discuss student rotation to various radiologic areas and procedures.
8. Demonstrate clinical experience logging procedures. (* 5)
9. Discuss methods for evaluating clinical experience students. (* 1 & 3)
10. Demonstrate clinical experience evaluation procedure.
11. Present lecture on clinical experience liability. (* 1,2 & 3)
12. Discuss patient/student liability.
13. Explain department procedure manual interpretation and use. (* 1)
14. Assign student to supervise a clinical experience student. (* 6)

CRITERION-REFERENCED MEASURE:

The student must identify regulations governing clinical experience, rotate student in various radiologic areas and procedure, log student's clinical experience and evaluate student's clinical performance.

PERFORMANCE GUIDE:

1. Familiarize students with rules and regulations of the facility, with which the student is to fully comply.
2. Provide direct supervision by qualified staff member, while the student is performing procedures.
3. Provide students with sufficient numbers and varieties of procedural experiences to satisfy requirements for clinical experience.
4. Maintain appropriate documentation of student's clinical experience and behavioral evaluations.

CHECKLIST

DUTY Performing Administrative And Clerical Functions

TASK Supervise clinical experience of students.

ENABLER

1. Identify radiologic accrediting agencies.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's performance when supervising a clinical experience student.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Familiarized student with facility's rules and regulations.	______	______
2. Provided student with supervision by qualified staff member.	______	______
3. Provided student with procedural experience to meet clinical experience requirements.	______	______
4. Logged student's clinical experiences.	______	______
5. Evaluated student's clinical experiences.	______	______
6. Maintained documentation of student's clinical experience.	______	______

PERFORMANCE OBJECTIVE NO. 42

TASK: Maintain student's clinical experience records.

STANDARD OF PERFORMANCE OF TASK:

Documentation of student's clinical experience must be maintained on file. Information necessary includes: student's name, exam performed, whether the exam was performed by the student with or without assistance from staff technologists, or whether the exam was merely observed by the student. Clinical instructor must sign all records. Patient identification information must be included with exams to enable retrieval of films.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Student
File folder
Clinical supervisor
Category total form
Clinical experience log sheets

ENABLING OBJECTIVES:

1. Identify accrediting agency's clinical experience fulfillment requirements.
2. Review department protocol for maintaining clinical experience records.

***RESOURCES:**

1. Department policy/procedure manual.
2. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
3. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
4. ASRT clinical experience competency recording log sheets.
5. Guest speaker - Clinical experience supervisor.

***RESOURCES:** (cont.)

6. Checklist - Maintaining clinical experience records.

TEACHING ACTIVITIES:

1. Present lecture on clinical experience documentation and record keeping. (* 2 & 3)
2. Explain accrediting agency clinical experience fulfillment requirements. (* 1)
3. Discuss the importance of complete and accurate clinical experience documentation and records.
4. Discuss clinical experience semester handouts, log sheets and student evaluation/competency forms.
5. Explain daily log sheet format. (* 4)
6. Demonstrate procedure for completing daily log sheets. (* 2 & 3)
7. Discuss methods for categorizing and tallying clinical experience log sheets. (* 2 & 3)
8. Demonstrate how to count, categorize and verify clinical experience exams and procedures experienced by students.
9. Introduce guest speaker to speak about rules, regulations and experiences when maintaining clinical experience records. (* 5)
10. Conduct a student/speaker question and answer session.
11. Demonstrate department protocol for conducting, documenting and filing clinical experience. (* 1)
12. Assign student to practice maintaining clinical experience. (* 6)

CRITERION-REFERENCED MEASURE:

The student must establish clinical experience requirements, complete daily log sheets, count, categorize and verify clinical experience exams and procedures experienced, document the clinical experience and file the clinical experience information in a permanent record according to department protocol.

PERFORMANCE GUIDE:

1. Provide student with clinical experience log sheets.
2. Inform student to fill out log sheet with all pertinent information on a daily basis.
   NOTE: Clinical instructor must sign log sheets on a daily basis.

PERFORMANCE GUIDE: (cont.)

3. Tally log sheet information and carry over to category total form.
4. Sign the student's log sheets.
5. File log sheets and category total forms in appropriate folders.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Maintain student's clinical experience records.

ENABLER

1. Maintain department protocol for maintaining clinical experience records.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**_________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's performance when evaluating student maintenance of experience records.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Provided student with clinical experience log sheet.	______	______
2.	Explained procedure for completion of daily log sheets.	______	______
3.	Demonstrated how to categorize, count and tally clinical experience.	______	______
4.	Demonstrated procedure for documenting clinical experience.	______	______
5.	Signed the student's log sheet.	______	______
6.	Filed clinical experience information in permanent file in accordance with department protocol.	______	______

DUTY: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

PERFORMANCE OBJECTIVE NO. 43

TASK: Maintain employee continuing education files.

STANDARD OF PERFORMANCE OF TASK:

Employee's files must be kept up-to-date documenting number of continuing education hours required/accumulated and renewal time or expiration date.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

File(s)
Sign-in sheet/verification form
Radiologic technologist
Continuing education program
Continuing education profile form
Educational coordinator or other designated person

ENABLING OBJECTIVES:

1. Identify continuing education requirements.
2. Review department policy for technologist's continuing education.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Program certification informational brochures.
5. Continuing education program sign-in sheet.
6. Continuing education sample file.
7. Checklist - Maintaining continuing education files.

TEACHING ACTIVITIES:

1. Discuss the reasons why technologists are required to take continuing education courses. (* 1,2,3 & 4)
2. List the type of seminars, classes, lectures, programs, etc. that are acceptable for continuing education points. (* 1).
3. Explain procedure for obtaining proof of continuing education points. (* 1,2,3 & 5).
4. Review contents of a continuing education master file. (* 1 & 5).
5. Discuss inportance for technologists to keep personal attendance records for verification.
6. Show students continuing education record-keeping forms. (* 1 & 5)
7. Demonstrate procedure for completing continuing education forms. (* 1 & 5)
8. Identify facility, state and federal mandatory requirements for continuing education points in each specialty field. (* 1,2,3 & 4)
9. Discuss the importance of keeping technologists informed concerning needed points. (* 1 & 4)
10. Instruct students to identify mandatory requirements in their specialty field. (* 4).
11. Assign students to update a continuing education file. (* 7)

CRITERION-REFERENCED MEASURE:

The student must obtain proof of credit for continuing education points, locate technologist's continuing education file, update the master continuing education file and notify technologist as to requirements he/she is lacking.

PERFORMANCE GUIDE:

1. Complete the sign-in sheet with the following information: Title of program, name of speaker, objective of program, target audience, date, time and location of program prior to commencement of the educational program.
   NOTE: Instruct persons attending program to sign the sign-in sheet.
2. Obtain continuing education files and transcribe educational activities information from sign-in sheet to each person's continuing education profile.
3. Request proof of attendance for qualifying programs of continuing education.
4. File each continuing education profile in the appropriate person's continuing education folder.

PERFORMANCE GUIDE: (cont.)

5. File sign-in sheet in continuing education master folder.
6. Keep employees informed about number of continuing education points accumulated and number of points needed by expiration date.

CHECKLIST

DUTY Performing Administrative and Clerical Functions

TASK Maintain employee continuing education files.

ENABLER

1. Identify continuing education requirements.
2. Establish department policy for technician continuing education.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to maintain employee continuing education files.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Completed the sign-in sheet.	______	______
2.	Obtained continuing education files and transcribed educational activities information from sign-in sheet to each person's continuing education profile.	______	______
3.	Requested proof of attendance for qualifying programs of continuing education.	______	______
4.	Filed each continuing education profile in the appropriate person's continuing education folder.	______	______
5.	Filed sign-in sheet in continuing education master folder.	______	______
6.	Kept employees informed about number of continuing education points accumulated and number of points needed by expiration date.	______	______

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 44

TASK: Transport patient in wheelchair.

STANDARD OF PERFORMANCE OF TASK:

The patient must be transported in a wheelchair without injury to patient or technologist, and without damage to patient's clothing or hospital equipment.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog

CONDITIONS FOR PERFORMANCE OF TASK:

Wheelchair
Patient's identification bracelet
Patient's chart
Testing/treatment orders
Examination

ENABLING OBJECTIVES:

1. Locate wheelchair for patient transfer.
2. Verify physician's orders and patient's identification.
3. Recall wheelchair operating safety rules.
4. Review established department procedure for transporting patient in wheelchair.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Eckert, C. (1981). Emergency-room care (4th ed.). Boston, MA: Little, Brown and Company.
4. Klippel, A., & Anderson, C. (1979). Manual of emergency and outpatient techniques. Boston, MA: Little, Brown and Company.
5. Neelon, F., & Ellis, G. (1975). A syllabus of problem-oriented patient care. Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

6. Salm, T., Cutler, B., & Wheeler H. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.
7. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
8. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
9. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.
10. Wheelchair.
11. Patient's chart.
12. Checklist - Transporting patient in wheelchair.

TEACHING ACTIVITIES:

1. Show students how to explain transportation procedure to patient. (* 1 & 2)
2. Review and demonstrate seating of patient into wheelchair utilizing accepted body mechanics. (* 1,6,7 & 8)
3. Stress and demonstrate how to clear clothing/gowns, tubes, IV's and catheters. (* 10)
4. Demonstrate how to lower foot rests and place patient's feet on rests. (* 10)
5. Show students how to release hand brake. (* 10)
6. Explain and demonstrate how to move wheelchair through the door and down hall. (* 3,4,5 & 9)
7. Explain and demonstrate how to transport patient in wheelchair using an elevator. (* 4,6,8,9 & 10)
8. Discuss procedure for making all turns slowly & carefully to avoid stress to patient. (* 1,7,8 & 9)
9. Instruct students to set hand brake when destination is reached. (* 10)
10. Monitor students as they practice transporting patients in wheelchair. (* 10 & 11)
11. Supervise and evaluate students transporting patients in wheelchair. (* 12)

CRITERION-REFERENCED MEASURE:

The student must identify patient, verify orders, lock wheelchair brakes, help patient into wheelchair, secure patient in wheelchair, insure patients comfort, transport patient in wheelchair, and lock wheelchair brakes at destination.

PERFORMANCE GUIDE:

1. Secure patient's chart and verify orders.
2. Set hand brake to lock wheels.
3. Identify patient and help them into the wheelchair, utilizing accepted body mechanics.
4. Provide bathrobe or blanket and non skid footwear.
5. Check to be sure clothing/gowns, tubes, IV's, and catheters are secure and clear from entanglement.
6. Lower foot rests and place patient's feet on them.
7. Explain transportation procedure to patient and fasten restraint.
8. Release hand brake to unlock wheels.
9. Transport patient along right side of hall.
10. Move wheelchair through door:
    - A. Approach closed doorway backwards.
    - B. Use one hand to open door and support door open with body.
    - C. Pull chair through doorway backwards.
    - D. Turn wheelchair forward after getting through door.
11. Using elevator with wheelchair:
    - A. Secure elevator door open.
    - B. Pull wheelchair onto elevator backwards.
    - C. Release elevator door and select desired floor.
    - D. Upon arrival at desired floor, secure door open.
    - E. Turn wheelchair around and exit elevator backwards.
    - F. Release elevator door.
12. Make all turns slowly and carefully to avoid stress to the patient.
13. Set hand brake to lock wheels when destination is reached.

CHECKLIST

DUTY Performing Patient Care Services

TASK Transport patient in wheelchair.

ENABLER

1. Locate wheelchair for patient transfer.
2. Verify physician's orders and patient's identification.
3. Recall wheelchair operating safety rules.

STUDENT'S NAME________________ **DATE**________

EVALUATOR'S NAME________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to transport patient in wheelchair.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Secured patient's chart and verified orders.		
2.	Set hand brake to lock wheels.		
3.	Identified patient and helped him/her into the wheelchair, utilizing accepted body mechanics.		
4.	Provided bathrobe or blanket and non-skid footwear.		
5.	Checked to be sure clothing/gowns, tubes, IV's, and catheters were secured and cleared from entanglement.		
6.	Lowered foot rests and placed patient's feet on them.		
7.	Explained transportation procedure to patient and fastened restraint.		
8.	Released hand brake to unlock wheels.		
9.	Transported patient along right side of hall.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Moved wheelchair through door:	____	____
- Approached closed doorway backwards.	____	____
- Used one hand to open door and supported door open with body.	____	____
- Pulled chair through doorway backwards.	____	____
- Turned wheelchair forward after getting through door.	____	____
11. Used elevator with wheelchair:		
- Secured elevator door open.	____	____
- Pulled wheelchair onto elevator backwards.	____	____
- Released elevator door and selected desired floor.	____	____
- Upon arrival at desired floor, secured door open.	____	____
- Turned wheelchair around and exited elevator backwards.	____	____
- Released elevator door.	____	____
12. Made all turns slowly and carefully to avoid stress to the patient.	____	____
13. Set hand brake to lock wheels when destination was reached.	____	____

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 45

TASK: Transport patient on a stretcher.

STANDARD OF PERFORMANCE OF TASK:

The patient must be moved without injury to the patient or technologist, and without damage to hospital equipment.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Stretcher
Patient
Patient's chart
Patient identification bracelet
Physician's orders

ENABLING OBJECTIVES:

1. Locate stretcher for transporting patient.
2. Identify patient's injury.
3. Recall safety procedures for using stretcher.
4. Review established department procedure for transporting patient on stretcher.

***RESOURCES:**

1. Department policy/procedure manual.
2. Eckert, C. (1981). Emergency-room care (4th ed.). Boston, MA: Little, Brown and Company.
3. Klippel, A., & Anderson, C. (1979). Manual of emergency and outpatient techniques. Boston, MA: Little, Brown and Company.
4. Neelon, F., & Ellis, G. (1975). A syllabus of problem-oriented patient care. Boston, MA: Little, Brown and Company.
5. Salm, T., Cutler, B., & Wheeler H. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

6. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
7. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
8. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
9. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.
10. Stretcher.
11. Patient's chart.
12. Checklist - Transporting patient on a stretcher.

TEACHING ACTIVITIES:

1. Show students how to identify patient and explain transportation procedure to patient. (* 1,6 & 11)
2. Show students how to lock stretcher wheels. (* 5,7,8,9 & 10)
3. Demonstrate how to ensure patient's privacy and comfort. (* 7,8 & 9)
4. Instruct and show students how to strap patient to the stretcher. (* 5,7,8 & 10)
5. Stress that student should check that extremities do not protrude and that all support apparatus will not tangle. (* 1,2,3,4 & 5)
6. Review and demonstrate procedure for transporting patient on stretcher. (* 2,3,4,5,7,8 & 9)
7. Explain and show students how to transport stretcher on elevator. (* 7,8,9 & 10)
8. Demonstrate method for approaching corners on right side of hallway and proceeding slowly and cautiously.
9. Monitor students as they practice transporting patients on a stretcher. (* 10 & 11)
10. Supervise and evaluate students transporting patients on a stretcher. (* 12)

CRITERION-REFERENCED MEASURE:

The student must identify patient, check orders, explain procedure, secure patient to stretcher, transport patient using stretcher, and lock stretcher wheels when destination is reached.

PERFORMANCE GUIDE:

1. Secure charts and verify orders.
2. Identify patient and explain transportation procedure.
3. Check patient's cover and comfort.
4. Check that patient is strapped to stretcher.
   NOTE: Ensure that extremities do not protrude and that all support apparatus (tubes, drainage bottles and catheters) will not tangle.
5. Transport patient feet first, walking at the head of the stretcher.
   - A. Move stretcher through door:
     1. Stand with back against door.
     2. Move stretcher through door by grasping side of stretcher and pulling through doorway.
     3. Release door after stretcher has cleared doorway.
6. Transport stretcher on elevator:
   - A. Secure elevator door.
   - B. Place stretcher in elevator foot-end first and stand at patient's head.
   - C. Exit elevator by pulling stretcher head first.
   - D. Release elevator door after stretcher has cleared doorway.
7. Approach corners on right hand side of hallway.
8. Turn corners slowly and cautiously.
9. Lock stretcher wheels when destination is reached.

CHECKLIST

DUTY Performing Patient Care Services

TASK Transport patient on a stretcher.

ENABLER

1. Locate stretcher for transporting patient.
2. Identify patient's injury.
3. Recall safety procedures for using stretcher.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to transport patient on a stretcher.

PERFORMANCE DETERMINANTS	YES	NO
1. Secured charts and verified orders.		
2. Identified patient and explained transportation procedure.		
3. Checked patient's privacy and comfort.		
4. Checked that patient was strapped to stretcher.		
5. Transported patient feet first, walking at the head of the stretcher.		
6. Moved stretcher through door:		
- Stood with back against door.		
- Moved stretcher through door by grasping side of stretcher and pulling through doorway.		
- Released door after stretcher had cleared doorway.		
7. Transported stretcher on elevator:		
- Secured elevator door.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
7. Transported stretcher on elevator: (cont.)		
- Placed stretcher in elevator foot-end first and stood at patient's head.	________	________
- Exited elevator by pulling stretcher head first.	________	________
- Released elevator door after stretcher had cleared doorway.	________	________
8. Approached corners on right hand side of hallway.	________	________
9. Turned corners slowly and cautiously.	________	________
10. Locked stretcher wheels when destination was reached.	________	________

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 46

TASK: Turn patient on table.

STANDARD OF PERFORMANCE OF TASK:

The patient must be positioned in the lateral, prone or supine position. The patient must be turned without injury and with minimal discomfort.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient
Sheet
Table
Cushions/sponges
Pillow (when allowable)

ENABLING OBJECTIVES:

1. Identify extent of patient's mobility.
2. Identify type of examination and positioning required.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ehrlich, R. and Givens, E. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
3. Ballinger, P. (1986). Radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Salm, T. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.
5. Chesney, D. and Chesney, M. (1986). Care of patient in diagnostic radiology. Boston, MA: Blackwell Scientific Publications.
6. Body planes.
7. Positioning chart.
8. Human model.
9. Checklist - Positioning patient.

TEACHING ACTIVITIES:

1. Present lecture on determining positions required based on examination to be performed. (* 1,2 & 3)
2. Conduct class discussion on the importance of radiographic positioning terminology in determining positioning needed for examination. (* 1,2 & 3)
3. Discuss body planes and anatomic positioning. (* 3 & 6)
4. Discuss position terminology and body movement terminology. (* 2 & 3)
5. Demonstrate body planes, anatomic positioning, and body movement on a model. (* 2,3 & 6)
6. Assign student a body plane, anatomic position and a body movement to identify and practice on a model. (* 8)
7. Present lecture on positioning patient for safety and comfort. (* 1,2,3,4,5 & 7)
8. Discuss the basic body positions including supine, prone, lateral recumbent, Sim's and Fowler's and the usefulness of each position. (* 2,3,4 & 7)
9. Discuss the use of positioning aids to obtain correct positioning and patient comfort. (* 2,3 & 4)
10. Discuss the use of restraints for patient safety. (* 2,3,4 & 5)
11. Conduct class discussion on situations requiring restraints or immobilization.
12. Demonstrate the procedure for placing a patient in each of the five basic positions utilizing positioning aids and restraints. (* 2,3,4 & 5)
13. Assign student a body plane & basic positioning worksheet. (* 7)
14. Monitor student while positioning a model in each of the five basic positions being practiced. (* 8)
15. Assign student a radiographic procedure and a model and instruct student to verbally explain procedure, determine positioning required for the procedure and to position model utilizing positioning aids and restraints. (* 9)

CRITERION-REFERENCED MEASURE:

The student must verbally explain the procedure to the patient, determine patient positioning for the procedure and position the patient utilizing positioning aids and restraints without causing injury or discomfort to the patient.

PERFORMANCE GUIDE:

1. Explain procedure to patient.
2. Maintain patient's privacy.
3. Turn patient from supine position to Sim's (left lateral) position:
    - A. Move patient to side of table to which patient's back will be turned.
    - B. Raise patient's arms and hands above head (when permissible).
    - C. Roll patient on left side.
    - D. Align patient's body straight along the long axis of table.
    - E. Place one leg on top of other and bend knees for support.
    - F. Position patient's lower arm to rear of patient.
    - G. Support body so that position is maintained.
    - H. Use cushions or sponges to relieve pressure from patient's knees or hips if necessary.
4. Turn patient from supine position to prone position:
    - A. Move patient to side of table to which patient's back will be turned.
    - B. Turn patient to side and continue to roll patient until patient is lying on abdomen. NOTE: Raise arm if possible.
    - C. Turn patient's head to one side.
    - D. Align patient's body with arms parallel to body and legs straight.
5. Turn patient from prone position to supine position:
    - A. Move patient to side of table to which patient's back will be turned.
    - B. Raise patient's arm above head on turning side.
    - C. Turn patient to side and continue to roll patient until patient is lying on back.
    - D. Straighten legs and place arms parallel to body.
6. Insure patient's comfort.

CHECKLIST

DUTY Performing Patient Care Services

TASK Turn patient on table.

ENABLER

1. Establish extent of patient mobility.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when turning a patient on the table.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Identified the positioning needed for procedure.	______	______
2.	Explained the procedure to patient.	______	______
3.	Maintained patient's privacy.	______	______
4.	Moved patient to required position.	______	______
5.	Utilized positioning blocks to obtain desired position and patient comfort.	______	______
6.	Immobilized or restrained patient as needed.	______	______
7.	Verified patient comfort and privacy.	______	______

PERFORMANCE OBJECTIVE NO. 47

TASK: Take patient's blood pressure.

STANDARD OF PERFORMANCE OF TASK:

The patient's blood pressure must be measured and both the systolic and diastolic recorded reading must be within + or - 4 points.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Stethoscope
Sphygmomanometer
Pen/Pencil
Antiseptic
Patient identification bracelet

ENABLING OBJECTIVES:

1. Locate patient's brachial artery.
2. Review department protocol for taking a patient's blood pressure.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ehrlich, R. and Givens, E. (1985). Patient care in radiology. St. Louis, MO: C.V. Mosby Company.
3. Chesney, D. and Chesney, M. (1986). Care of patient in diagnostic radiology. Boston, MA: Blackwell Scientific Publications.
4. Shamanshy, S. (1984). Primary health care handbook. Boston, MA: Little, Brown and Company.
5. Pulse locations.
6. Sphygmomanometer.
7. Checklist - Taking blood pressure.

TEACHING ACTIVITIES:

1. Present lecture on anatomical terminology and location. (* 2,3 & 4)
2. Discuss positioning of arm for taking blood pressure. (* 1,2,3 & 4)
3. Discuss and demonstrate pulse location. (* 2,3,4 & 5)
4. Present lecture on equipment needed to take a patient's blood pressure. (* 2,3,4 & 6)
5. Discuss components of a sphygmomanometer. (* 2,3,4 & 6)
6. Demonstrate how to assemble and test sphygmomanometer components. (* 2,3 & 4)
7. Demonstrate how to test stethoscope for functionability. (* 2,3 & 4)
8. Present lecture on measuring and recording blood pressure. (* 2,3 & 4)
9. Discuss systolic and diastolic pressure. (* 1,2,3 & 4)
10. Discuss and demonstrate procedure for taking systolic and diastolic pressure. (* 1,2,3 & 4)
11. Discuss and demonstrate how to read, report and record blood pressure reading. (* 1,2,3 & 4)
12. Monitor student practice while assembling & testing blood pressure equipment. (* 7)
13. Monitor student practice while taking patient's blood pressure.
14. Assign student to take patient's blood pressure. (* 8)

CRITERION-REFERENCED MEASURE:

The student must assemble equipment needed to take patient's blood pressure, obtain systolic and diastolic blood pressure reading within + or - 4 points and record the readings on patient's chart.

PERFORMANCE GUIDE:

1. Assemble equipment and clean ear pieces and diaphragm of stethoscope with antiseptic.
2. Identify patient and explain procedure.
3. Position patient's arm and wrap deflated sphygmomanometer cuff around upper arm, centered over brachial artery, and fasten cuff securely.
4. Position bell or disc of stethoscope over brachial artery.

PERFORMANCE GUIDE: (cont.)

5. Measure and record systolic pressure:
    A. Inflate cuff.
    B. Release cuff valve.
    C. Listen for first thumping in stethoscope.
    D. Note sphygmomanometer indicator reading.
6. Measure and record diastolic pressure:
    A. Continue to release cuff pressure.
    B. Listen for sound to become muffled or stop.
    C. Note sphygmomanometer indicator reading.
7. Release cuff air pressure.
8. Repeat steps four through six as necessary.
9. Remove cuff.
10. Record systolic and diastolic blood pressure readings on patient's chart according to facility guidelines.

CHECKLIST

DUTY Performing Patient Care Services

TASK Take patient's blood pressure.

ENABLER

1. Locate patient's brachial artery.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when taking patient's blood pressure.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Assembled, cleaned and tested equipment.	______	______
2.	Identified patient and explained procedure.	______	______
3.	Positioned patient's arm.	______	______
4.	Wrapped deflated sphygmomanometer cuff around upper arm.	______	______
5.	Centered cuff over brachial artery and fastened securely.	______	______
6.	Positioned bell or disc of stethoscope over brachial artery.	______	______
7.	Measured systolic pressure.	______	______
8.	Measured diastolic pressure.	______	______
9.	Released cuff air pressure.	______	______
10.	Repeated procedure if necessary.	______	______
11.	Removed cuff.	______	______
12.	Recorded systolic and diastolic blood pressure readings on patient's chart.	______	______

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 48

TASK: Take patient's pulse and respiration.

STANDARD OF PERFORMANCE OF TASK:

The patient's pulse and respiration results must be recorded with the pulse rate accurate to within + or - 4 beats and the respiratory rate accurate to within + or - 2 breaths.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Watch (with second hand)
Examination table or chair

ENABLING OBJECTIVES:

1. Identify pulse locations.
2. Locate patient's pulse.
3. Read the second hand on a clock.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ehrlich, R. and Givens, E. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
3. Shamanshy, S. (1984). Primary health care handbook. Boston, MA: Little, Brown & Company.
4. Salm, T. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.
5. Chesney, D. and Chesney, M. (1986). Care of patient in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
6. Pulse locations.
7. List of irregularities in pulse and respiration.
8. Checklist - Establish patient's pulse and respiration.

TEACHING ACTIVITIES:

1. Present lecture on the importance of pulse rate and respiration rate in radiology. (* 2,3,4 & 5)
2. Discuss anatomy terminology and location. (* 2,5 & 6)
3. Conduct class discussion on situations and procedures where pulse and respiration identification could be crucial.
4. Discuss pulse and respiration irregularities and their common causes. (* 2,3,5 & 8)
5. Present lecture on pulse taking procedures. (* 1,2,3,4 & 5)
6. Discuss pulse counting procedures. (* 1,2,3,4 & 5)
7. Discuss pulse force and rhythm interpretation and what they mean. (* 2,3,4 & 5)
8. Question students on methods of taking a pulse.
9. Demonstrate positioning of patient's arm and technologist's fingers when taking a pulse. (* 2,3,4,5 & 6)
10. Demonstrate the coordination of timing and counting a pulse. (* 2,3,4 & 5)
11. Discuss the length of time a pulse is counted and how to calculate total pulse rate. (* 2,3,4 & 5)
12. Discuss pulse rate terminology (normal, fast, slow) and what they mean. (* 2,3,4 & 5)
13. Present a lecture on determining a patient's respiration rate. (* 1,2,3,4 & 5)
14. Conduct class discussion on respiration irregularities and possible causes. (* 2,3,5 & 7)
15. Demonstrate how to determine patient's respiration rate, visually and physically.
16. Divide students into groups of two and monitor them practicing taking a pulse and respiration rate for each other.
17. Assign students to take a patient's pulse and respiration. (* 8)

CRITERION-REFERENCED MEASURE:

The student must locate patient's pulse, count pulse rate, count respiration rate, note any irregularities in pulse or respiration and record findings on the patient's chart.

PERFORMANCE GUIDE:

1. Verify patient's identification and explain procedure to the patient.
2. Place patient's arm and hand, thumb up, in relaxed position.

PERFORMANCE GUIDE: (cont.)

3. Place two or three fingers on patient's radial artery.
4. Count beats for 20 seconds.
5. Multiply number of beats by three to obtain beats per minute.
6. Determine force, rhythm, and volume of pulse.
7. Record pulse rate and characteristics on patient's chart.
8. Observe patient's chest, count respirations for 30 seconds.
9. Multiply count by two for respiration per minute.
10. Count respiration for a full minute if irregularities in breathing are noted.
11. Record respiratory rate and characteristics on patient's chart, according to facility guidelines.

CHECKLIST

DUTY Performing Patient Care Service

TASK Take patient's pulse and respiration.

ENABLER

1. Locate patient's pulse.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's performance when taking patient's pulse and respiration.

PERFORMANCE DETERMINANTS	YES	NO
1. Verified patient's identification and explained procedure to the patient.		
2. Positioned patient's arm and hand.		
3. Placed two or three fingers on patient's radial artery.		
4. Counted number of beats for specified time frame.		
5. Determined force, rhythm and volume of pulse.		
6. Recorded patient's pulse rate and characteristics on patient's chart.		
7. Observed patient's chest and counted respirations for specified time frame.		
8. Noted any irregularities in breathing.		
9. Recorded respiratory rate and characteristics on patient's chart.		

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 49

TASK: Administer intravenous infusion (injection).

STANDARD OF PERFORMANCE OF TASK:

The patient must be positively identified and the type of intravenous fluid verified with the physician's orders. The intravenous needle must be placed in the patient's vein and the infusion regulated to deliver the prescribed number of drops per minute according to physician's orders. The intravenous container and tubing must be labeled including patient's name, intravenous number, dosage rate, absorption rate, date, time administered and container number. The vein puncture site must be observed for redness, swelling or other adverse reactions.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Practical Nursing Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient identification bracelet
Patient's chart
Intravenous pole or standard
Physician's orders
Antiseptic
Razor
Intravenous solution (bottle or bag)
Armboard
Intravenous needle
Alcohol swab; gauze
Tape
Dressing or bandaid
Intravenous administration set
Watch (with second hand)

ENABLING OBJECTIVES:

1. Identify type and location of intravenous to be administered.
2. Verify patient's medical history.
3. Review established department policy on administering an intravenous infusion.

***RESOURCES:**

1. Department policy/procedure manual.
2. Klippel, A., & Anderson, C. (1979). Manual of emergency and outpatient techniques. Boston, MA: Little, Brown and Company.
3. Plumer, A. (1987). Principles and practice of intravenous therapy (4th ed.). Boston, MA: Little, Brown and Company.
4. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
5. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
6. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
7. Moss, A., Rin, E., & Higgins, C. (1986). NMR, CT and interventional radiology. St. Louis, MO: C.V. Mosby Company.
8. Ring, E., & McLean, G. (1987). Interventional radiology: Principles and techniques. Boston, MA: Little, Brown and Company.
9. Rose, J. (1983). Invasive radiology: Risks and patient care. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
10. Intravenous kit.
11. Intravenous stand.
12. Phantom arm model.
13. Checklist - Administering intravenous infusion.

TEACHING ACTIVITIES:

1. Discuss the importance of correct interpretation of physician's orders and verification of patient's medical history and allergies.
2. Review method for washing hands and assembling equipment and supplies. (* 1,2 & 5)
3. Demonstrate procedure for washing hands and assembling equipment & supplies. (* 1,2 & 5)
4. Explain how to verify expired intravenous bottles and defective equipment.
5. Review procedure for verifying correct intravenous solution to the procedure to be performed. (* 1,3,7,8 & 9)
6. Discuss procedure for setting up the intravenous equipment. (* 3,7,8 & 9)
7. Demonstrate intravenous setup procedure. (* 3,7,8,9,10 & 11)
8. Stress importance of utilizing sterile equipment and techniques. (* 1 & 5)

TEACHING ACTIVITIES: (cont.)

9. Discuss procedure for labeling intravenous bottle and tubing. (* 3,7,8 & 9)
10. Present lecture on connecting an intravenous to a patient. (* 1,3,7,8 & 9)
11. Stress the need for technologist to be intravenous certified. (* 1)
12. Discuss & demonstrate procedures for selecting, cleaning and shaving puncture site. (* 1,2,4 & 5)
13. Demonstrate intravenous administration techniques. (* 3,7,8 & 9)
14. Show how to verify that intravenous needle is inserted in patient's vein. (* 1,3,5,7,8 & 9)
15. Review method for securing needle in puncture site. (* 1,5,7,8 & 9)
16. Demonstrate procedure for securing intravenous tubing. (* 1,5,7,8 & 9)
17. Discuss and demonstrate procedure for calculating and adjusting intravenous flow rate. (* 1)
18. Explain what infiltration means and how to check for it. (* 1,3,5 & 7)
19. Demonstrate procedure for checking the puncture site for signs of infiltration and patient's vital signs.
20. Monitor students practicing administering intravenous infusion (injection).
21. Assign students to administer an intravenous infusion (injection). (* 13)

CRITERION-REFERENCED MEASURE:

The student must identify the type of procedure to be performed, identify the intravenous solutions needed for the procedure, verify patient's identification and allergy history, check chart for signed permission, assemble equipment and supplies, set up equipment, administer intravenous solution to patient, calculate and adjust intravenous flow rate, monitor puncture site for signs of infiltration and record intravenous administration information on patient chart in accordance with department policy/procedure manual.

PERFORMANCE GUIDE:

1. Check physician's orders, verify patient's identity and medical allergy history, and explain procedure.
2. Wash hands and assemble equipment and supplies.

PERFORMANCE GUIDE: (cont.)

3. Check for defective equipment or expired intravenous solutions.
   NOTE: Discard and replace defective equipment or expired intravenous solution.
4. Verify intravenous solution with physician's orders.
5. Set up intravenous pole and open administration set maintaining sterility of tubing ends.
6. Slide tubing clamp along tubing until it is just below drip chamber and close clamp.
7. Insert intravenous tubing into intravenous container using aseptic technique.
8. Hang intravenous fluid container on intravenous hanger approximately 3 feet above patient's head.
9. Verify that drip chamber fills to half full and all air is clear from intravenous tubing.
10. Label intravenous fluid container:
    A. Patient's name.
    B. Patient's identification number.
    C. Dosage.
    D. Absorption rate.
    E. Date.
    F. Time.
    G. Container number.
11. Label intravenous tubing:
    A. Date.
    B. Time of attachment.
12. Select vein puncture site.
    NOTE: Shave vein puncture site if necessary.
13. Cleanse site with alcohol swab.
14. Apply tourniquet, palpate site with finger and cleanse site with povidone-iodine swab.
15. Support vein with thumb and index finger.
16. Puncture vein with slanting edge of needle up advancing needle slowly.
17. Remove tourniquet and open flow rate clamp.
18. Apply gauze dressing and secure needle with tape.
19. Loop intravenous tubing and tape securely.
20. Calculate and adjust flow rate according to physician's orders and using manufacturer's instructions printed on intravenous fluid container.
21. Check site for infiltration.
    A. If infiltrated, restart intravenous in new site.
       CAUTION: Vein puncture site must be observed for swelling, redness or other adverse effects.
22. Assure patient comfort and chart type, drip rate and time of intravenous fluid administration.

CHECKLIST

DUTY Performing Patient Care Services

TASK Administer intravenous infusion (injection).

ENABLER

1. Identify type and location of intravenous to be administered.
2. Verify patient's medical history.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to administer intravenous infusion (injection).

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Checked physician's orders, verified patient's identity and explained procedure.		
2. Checked for defective equipment or expired intravenous solutions.		
3. Verified intravenous solution with physician's orders.		
4. Washed hands and assembled equipment an supplies.		
5. Set up intravenous pole and opened administration set maintaining sterility of tubing ends.		
6. Slid tubing clamp along tubing until it was just below drip chamber and closed clamp.		
7. Inserted intravenous tubing into intravenous container using aseptic technique.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
8.	Hung intravenous fluid container on intravenous hanger approximately 3 feet above patient's head.		
9.	Verified that drip chamber filled to half full and all air was cleared from intravenous tubing.		
10.	Labeled intravenous fluid container:		
	- Patient's name.		
	- Patient's identification number.		
	- Dosage.		
	- Absorption rate.		
	- Date.		
	- Time.		
	- Container number.		
11.	Labeled intravenous tubing:		
	- Date.		
	- Time of attachment.		
12.	Selected vein puncture site.		
13.	Cleansed site with alcohol swab.		
14.	Applied tourniquet, palpated site with finger and cleansed site with povidone-iodine swab.		
15.	Supported vein with thumb and index finger.		
16.	Punctured vein with slanting edge of needle up advancing needle slowly.		
17.	Removed tourniquet and opened flow rate clamp.		
18.	Applied gauze dressing and secured needle with tape.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
19.	Looped intravenous tubing and taped securely.		
20.	Calculated and adjusted flow rate according to physician's orders and using manufacturer's instructions printed on intravenous fluid container.		
21.	Checked site for infiltration.		
22.	Assured patient's comfort and charted type, drip rate and time intravenous fluid administered.		

DUTY: PERFORMING PATIENT CARE SERVICE

PERFORMANCE OBJECTIVE NO. 50

TASK: Administer oxygen to patient.

STANDARD OF PERFORMANCE OF TASK:

The patient must be positively identified and the oxygen liter flow and method of administration must be the same as designated by the physician's orders.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's order
Patient identification bracelet
Patient's chart
No smoking signs
Oxygen source
Oxygen administration sets

ENABLING OBJECTIVES:

1. Locate oxygen supply.
2. Locate oxygen administration set.
3. Identify safety procedures for administering oxygen.
4. Review established department procedures for administering oxygen.

***RESOURCES:**

1. Department policy/procedure manual.
2. Caroline, N. (1987). Emergency medical treatment. Boston, MA: Little, Brown and Company.
3. Eckert, C. (1981). Emergency-room care (4th ed.). Boston, MA: Little, Brown and Company.
4. Jenkins, J., & Loscalzo, J. (1986). Manual of emergency medicine. Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

5. Klippel, A., & Anderson, C. (1979). Manual of emergency and outpatient techniques. Boston, MA: Little, Brown and Company.
6. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
7. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
8. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
9. Oxygen source.
10. Oxygen administration set.
11. "No Smoking" sign.
12. Patient's chart.
13. Checklist - Administering oxygen to a patient.

TEACHING ACTIVITIES:

1. Discuss procedures for verifying patient's identification and physician's orders. (* 1 & 12)
2. Stress importance of using "No Smoking" signs in oxygen administration area and conduct class discussion on reason "No Smoking" signs are used in oxygen administration area. (* 6,7 & 8)
3. Demonstrate how to post "No Smoking" signs. (* 9,10 & 11)
4. Identify where oxygen outlet is located. (* 1 & 9)
5. Conduct class discussion on procedures for connection of humidifier. (* 1,2,3,4,5 & 10)
6. Demonstrate connection of humidifier. (* 9 & 10)
7. Review and demonstrate procedures for connection of flow meter. (* 2,3,4,5,9 & 10)
8. Explain and show procedure for connecting tubing to humidifier. (* 2,3,4,5,9 & 10)
9. Discuss and demonstrate procedure for connecting tubing to cannula, mask, or tent. (* 2,3,4,5,9 & 10)
10. Show students how to locate and adjust oxygen valve. (* 9 & 10)
11. Explain in class discussion procedure for adjusting cannula, mask, or tent. (* 1,2,3,4 & 5)
12. Demonstrate adjustment of cannula, mask, or tent. (* 9 & 10)
13. Review method for recording procedure on patient's chart. (* 1,6,7,8 & 12)

TEACHING ACTIVITIES: (cont.)

14. Monitor students as they practice administering oxygen. (* 9,10,11 & 12)
15. Supervise and evaluate students administering oxygen to a patient. (* 13)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and physician's orders, post "No Smoking" signs in oxygen administration area, connect oxygen administration set to oxygen source, adjust oxygen flow, adjust cannula, mask or tent over patient, and record procedure on patient's chart.

PERFORMANCE GUIDE

1. Identify patient, check physician's orders, and explain procedure.
2. Post "NO SMOKING" sign on door and instruct all persons present not to smoke.
3. Connect humidifier and flow meter to oxygen outlet.
4. Connect tubing to humidifier bottle, and cannula, mask or tent.
5. Adjust oxygen valve for prescribed oxygen flow.
6. Fit and adjust cannula, mask or tent to patient.
7. Record procedure on patient's chart.

CHECKLIST

DUTY Performing Patient Care Services

TASK Administer oxygen to patient.

ENABLER

1. Locate oxygen supply.
2. Recall safety procedures for administering oxygen.
3. Locate oxygen administration set.

STUDENT'S NAME________________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to administer oxygen to patient.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Identified patient, checked physician's orders, and explained procedure.		
2.	Posted "NO SMOKING" sign on door and instructed all persons present not to smoke.		
3.	Connected humidifier and flow meter to oxygen outlet.		
4.	Connected tubing to humidifier bottle, and cannula, mask or tent.		
5.	Adjusted oxygen valve for prescribed oxygen flow.		
6.	Fitted and adjusted cannula, mask or tent to patient.		
7.	Recorded procedure on patient's chart.		

PERFORMANCE OBJECTIVE NO. 51

TASK: Transfer patient between examination table and wheelchair.

STANDARD OF PERFORMANCE OF TASK:

The patient must be transferred between the examination table and wheelchair without injury to patient or damage to hospital equipment.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Sheet
Wheelchair
Foot stool
Examination table

ENABLING OBJECTIVES:

1. Identify patient's injury.
2. Locate and prepare wheelchair for the patient.
3. Review established department procedure for transferring a patient between examination table and wheelchair.

***RESOURCES:**

1. Department policy/procedure manual.
2. Klippel, A., & Anderson, C. (1979). Manual of emergency and outpatient techniques. Boston, MA: Little, Brown and Company.
3. Salm, T., Cutler, B., & Wheeler H. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.
4. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
5. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.

*RESOURCES: (cont.)

6. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
7. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.
8. Wheelchair.
9. Foot stool.
10. Examination table.
11. Checklist - Transferring patient between examination table and wheelchair.

TEACHING ACTIVITIES:

1. Conduct class discussion of proper method of transferring patient between examination table and wheelchair. (* 1,6 & 7)
2. Identify procedure to verify patient's identification and explain procedure of transfer. (* 1 & 4)
3. Explain and show students how to position wheelchair beside table, facing head of table. (* 2,3,5,6 & 7)
4. Instruct students to set wheel brakes and raise foot rests. (* 2,3 & 8)
5. Demonstrate how to set wheel brakes and raise foot rests. (* 8)
6. Explain and show students how to assist patient to sitting position on examination table with legs dangling and remove sheet. (* 5,6,7 & 8)
7. Discuss ways to ensure patient stability before proceeding. (* 5,6 & 7)
8. Explain and demonstrate how to assist patient to standing position on footstool. (* 6,7 & 9)
9. Show students how to assist patient to step down from footstool. (* 6,7 & 9)
10. Explain and demonstrate how to assist patient to pivot and lower body into wheelchair. (* 6,7,8 & 9)
11. Identify and demonstrate the above steps in reverse to move patient from chair to table.
12. Discuss and show students how to cover patient with a sheet. (* 1,2,6 & 7)
13. Demonstrate how to ensure patient is comfortable before leaving. (* 1,5 & 6)
14. Monitor students as they practice transferring patient between examination table and wheelchair. (* 8,9 & 10)

TEACHING ACTIVITIES: (cont.)

15. Supervise and evaluate students transferring patient between examination table and wheelchair. (* 11)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, position wheelchair by examination table, set wheelchair breaks, position footstool, assist patient into wheelchair, cover patient with sheet, and verify patient's comfort and safety.

PERFORMANCE GUIDE:

1. Verify patient's identification and explain procedure.
2. Position wheelchair beside table, facing head of table.
3. Set wheel brakes and raise foot rests.
4. Assist patient to sitting position on the examination table with legs dangling and remove sheet.
5. Ensure patient stability before proceeding.
6. Assist patient to standing position on foot stool.
7. Assist patient to step down from foot stool.
8. Assist patient to pivot and lower body into wheelchair.
9. Reverse procedure to move patient from wheelchair onto examination table.
10. Cover patient with sheet.
11. Ensure patient is comfortable and secure before leaving.

CHECKLIST

DUTY Performing Patient Care Services

TASK Transfer patient between examination table and wheelchair.

ENABLER

1. Identify patient's injury.
2. Locate and prepare wheelchair for the patient.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to transfer patient between examination table and wheelchair.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Verified patient's identification and explained procedure.	______	______
2. Positioned wheelchair beside table, facing head of table.	______	______
3. Set wheel brakes and raised foot rests.	______	______
4. Assisted patient to sitting position on the examination table with legs dangling and removed sheet.	______	______
5. Ensured patient stability before proceeding.	______	______
6. Assisted patient to standing position on foot stool.	______	______
7. Assisted patient to step down from foot stool.	______	______
8. Assisted patient to pivot and lower body into wheelchair.	______	______
9. Reversed procedure to move patient from wheelchair onto examination table.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Covered patient with sheet.	________	________
11. Ensured patient was comfortable and secure before leaving.	________	________

PERFORMANCE OBJECTIVE NO. 52

TASK: Transfer patient between stretcher and examination table.

STANDARD OF PERFORMANCE OF TASK:

The patient must be transferred between a stretcher and examination table. The transfer must be completed without injury or discomfort to patient or damage to hospital equipment.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's identification bracelet
Examination table
Patient's chart
Transfer sheet
Stretcher
Two assistants
Patient assist device
Top sheet
(Dixies glider, powder board, etc.)

ENABLING OBJECTIVES:

1. Locate and prepare stretcher for transfer.
2. Locate patient to be transferred.
3. Identify extent and nature of injury.
4. Review established department policy/procedure for transferring patient between stretcher and examination table.

***RESOURCES:**

1. Department policy/procedure manual.
2. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
3. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

4. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.
5. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
6. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
7. Stretcher.
8. Examination table.
9. Patient's chart.
10. Checklist - Transferring patient between stretcher and examination table.

TEACHING ACTIVITIES:

1. Discuss and demonstrate how to verify patient's identification and explain procedure to patient. (* 1,6 & 9)
2. Review and demonstrate how to place stretcher against examination table and lock stretcher wheels. (* 1,5,7 & 8)
3. Show students how to cover patient with a top sheet. (* 3,4 & 8)
4. Show students how to arrange patient in comfortable position in center of the examination table. (* 1,3,4 & 8)
5. Review and demonstrate how to transfer mobile patient between stretcher and examination table. (* 2,3,4 & 5)
6. Explain and show students how to transfer immobile patient between stretcher and examination table using transfer sheet. (* 2,3,4 & 5)
7. Monitor students as they practice transferring immobile and mobile patients between stretcher and examination table. (* 7,8 & 9)
8. Supervise and evaluate students transferring mobile and immobile patients between stretcher and examination table. (* 10)

CRITERION-REFERENCED MEASURE:

The student must identify patient and explain procedure, position stretcher parallel to examination table, cover patient, transfer patient to examination table, and place patient in a comfortable position in center of examination table.

PERFORMANCE GUIDE:

1. Identify patient and explain procedure.
2. Place stretcher parallel and level to the table with stretcher tight against the examination table and lock the stretcher wheels.
3. Cover patient with a top sheet.
4. Transfer patient:
   A. Mobile patient:
      1. Remove IV's drainage bottles and catheter tubes from holders or hangers.
      2. Instruct patient to carefully move from stretcher to center of examination table.

   B. Immobile patient:
      1. Position transfer sheet (bottom sheet) so it extends from patient's head to below the knees.
      2. Place one person on each side of patient and one at patient's head.
      3. Remove IV's, discharge bottles or catheter tubing from hanger or holders.
      4. Grasp transfer sheet and gently slide patient on examination table by lifting and pulling evenly on transfer sheet.
5. Arrange patient in comfortable position in center of examination table.

CHECKLIST

DUTY Performing Patient Care Services

TASK Transfer patient between stretcher and examination table.

ENABLER

1. Locate patient to be transferred.
2. Identify extent and nature of injury.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to transfer patient between stretcher and examination table.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Identified patient and explained procedure.		
2.	Placed stretcher parallel and level to the table with stretcher tight against the examination table and locked the stretcher wheels.		
3.	Covered patient with a top sheet.		
4.	Removed intravenous drainage bottles and catheter tubes from holders or hangers.		
5.	Instructed patient to carefully move from stretcher to center of examination table.		
6.	Transferred patient.		
7.	Positioned transfer sheet (bottom sheet) so it extended from patient's head to below the knees.		
8.	Placed one person on each side of patient and one at patient's head.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Disconnected IV's and, discharged bottles or catheter tubing from hanger or holders.	________	________
10. Grasped transfer sheet and gently slid patient on examination table by lifting and pulling evenly on transfer sheet.	________	________
11. Arranged patient in comfortable position in center of examination table.	________	________

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 53

TASK: Immobilize pediatric patient.

STANDARD OF PERFORMANCE OF TASK:

Pediatric patient must be rendered immobile, assuring the safety and well-being of the patient throughout the procedure.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Assistant
Patient's chart
Pediatric patient
Physician's request
Patient identification
Immobilization device

ENABLING OBJECTIVES:

1. Identify age and size of patient.
2. Recall immobilization techniques for patients.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ehrlich, R. and Givens, E. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
3. Salm, T. (1987). Atlas of bedside procedures. (2nd ed.). Boston, MA: Little, Brown and Company.
4. Chesney, D. and Chesney, M. (1986). Care of patient in diagnostic radiology. Boston, MA: Blackwell Scientific Publications.
5. Gull, C. (1985). A handbook of pediatric imaging. Boston, MA: Blackwell Scientific Publications.
6. Kirks, D. (1984). Practical pediatric imaging. Boston, MA: Little, Brown & Company.
7. Immobilization devices..
8. Checklist - Immobilization of patient.
9. Guest speaker - Pediatric specialist.
10. ASRT video - Pediatric radiography.

TEACHING ACTIVITIES:

1. Present lecture on pediatric immobilization. (* 2,6 & 7)
2. Discuss the reasons for restraining and/or immobilizing the patient. (* 1,2,3 & 4)
3. Assign class to write three radiographic situations that might require restraint/immobilization.
4. Introduce guest speaker (pediatric doctor, nurse or technologist) to discuss pediatric immobilization and answer questions. (* 10)
5. Conduct class discussion addressing the listed situations.
6. Discuss and identify the different types of restraints and/or immobilization devices utilized in a radiology department. (* 2,4,5,6 & 7)
7. Demonstrate the positioning of restraints and/or immobilization devices. (* 2,4,5 & 6)
8. Demonstrate pediatric immobilization procedures. (* 2,4,5,6 & 10)
9. Monitor student practicing/utilizing immobilization and/or restraining device.
10. Discuss ethics and liability concerning the use of immobilization/restraints with pediatric patients. (* 1,2,3,4,5 & 6)
11. Conduct group discussion on the need and importance of reassuring pediatric patient and remaining with patient or within patient's sight at all times. (* 1,5 & 6)
12. Demonstrate methods of reassuring pediatric patients. (* 2,3,4 & 5)
13. Monitor students practicing reassurance methods.
14. Assign student to immobilize a pediatric patient. (* 9)

CRITERION-REFERENCED MEASURE:

The student must determine the patient's age & size, select the appropriate immobilization device, position the device on the examination table and immobilize a pediatric patient.

PERFORMANCE GUIDE:

1. Verify physician's request.
2. Select type of immobilization device needed and prepare immobilization device prior to arrival of patient.
3. Greet patient and verify patient's identification.
   NOTE: All preparatory steps for the exam should be accomplished prior to placing child in immobilization device.

PERFORMANCE GUIDE (cont.)

4. Place patient in immobilization device and secure patient.
   NOTE: Help of an assistant may be required.
5. Remain with patient at all times.
   NOTE: At no time shall the pediatric patient be left unattended.

CHECKLIST

DUTY Performing Patient Care Services

TASK Immobilize pediatric patient.

ENABLER

1. Identify age and size of patient.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's performance when immobilizing a pediatric patient.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Verified the type of examination to be performed.	_______	_______
2. Selected type of immobilization and/or restraint device needed.	_______	_______
3. Positioned immobilization device prior to arrival of patient.	_______	_______
4. Greeted patient and verified patient's identification.	_______	_______
5. Placed patient in immobilization device.	_______	_______
6. Secured immobilization device without distressing or injuring patient.	_______	_______
7. Remained with patient at all times until examination was completed.	_______	_______

PERFORMANCE OBJECTIVE NO. 54

TASK: Prep patient's skin.

STANDARD OF PERFORMANCE OF TASK:

The patient's skin must be aseptically cleaned using the prescribed prepping procedure. The patient's privacy must be maintained at all times.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Wash basin
Prep tray
Sterile gloves
Examination table/chair

ENABLING OBJECTIVES:

1. Verify patient's identification and area to be prepped according to procedure.
2. Assemble materials needed to prep skin.
3. Review established department policy for prepping patient's skin.

***RESOURCES:**

1. Department policy/procedure manual.
2. Klippel, A., & Anderson, C. (1979). Manual of emergency and outpatient techniques. Boston, MA: Little, Brown and Company.
3. Salm, T., Cutler, B., & Wheeler H. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
5. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
6. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.
7. Prep tray.

***RESOURCES:** (cont.)

8. Human model.
9. Checklist - Prepping patient skin.

TEACHING ACTIVITIES:

1. Conduct class discussion on importance of verifying patient identification and providing patient's privacy. (* 1,4 & 5)
2. Discuss and demonstrate technique for washing hands and donning sterile gloves. (* 1,2,3,4,5 & 6)
3. Discuss procedure for prepping patient skin. (* 1,2,3,4,5 & 6)
4. Demonstrate technique for applying antiseptic solution and scrubbing area to be prepped. (* 7 & 8)
5. Discuss and demonstrate method for drying area with a sterile sponge. (* 1,2,3,4,5,6,7 & 8)
6. Discuss purpose of a sterile drape. (* 1,4 & 5)
7. Show students how to apply a sterile drape. (* 7 & 8)
8. Monitor students practicing prepping a patient's skin. (* 7 & 8)
9. Assign student to prep a patient's skin. (* 9)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification, locate area to be prepped, assure patient's privacy, don sterile gloves, apply antiseptic solution, scrub the area in circular motion moving from center to outer edge, dry area using a sterile sponge and apply a sterile drape to prepped area.

PERFORMANCE GUIDE:

1. Verify patient's identification and procedure to be performed and explain preparation procedure to patient.
2. Provide for patient's privacy.
3. Wash hands and put on sterile gloves.
4. Apply antiseptic solution to area to be prepped and scrub with circular motion working from center to outer edge.
   NOTE: Refer to antiseptic product directions/data sheet.
5. Repeat scrubbing procedure after area is dry.
6. Dry area with sterile sponge, using circular motion working from center to outer edge.
7. Apply sterile drape to scrubbed area to maintain an aseptic field.

CHECKLIST

DUTY Performing Patient Care Services

TASK Prep patient's skin.

ENABLER

1. Verify patient's identification, procedure and area to be prepped.
2. Assemble materials needed to prep skin.

STUDENT'S NAME________________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prep patient's skin.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified patient's identification and explained procedure to patient.		
2.	Provided for patient's privacy.		
3.	Washed hands and put on sterile gloves.		
4.	Applied antiseptic solution to area to be prepped and scrubbing with circular motion working from center to outer edge.		
5.	Repeated scrubbing procedure after area was dry.		
6.	Dried area with sterile sponge, using circular motion working from center to outer edge.		
7.	Applied sterile drape to scrubbed area to maintain an aseptic field.		

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 55

TASK: Regulate intravenous infusion.

STANDARD OF PERFORMANCE OF TASK:

The infusion must be regulated to the prescribed number of drops per minute as indicated in physician's order.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Intravenous infusion
Patient's chart
Physician's order
Watch (with second hand)

ENABLING OBJECTIVES:

1. Identify physician's orders.
2. Verify patient's identification.
3. Explain procedure to patient.
4. Review established department procedure for regulating intravenous infusion.

***RESOURCES:**

1. Department policy/procedure manual.
2. Plumer, A. (1987). Principles and practice of intravenous therapy (4th ed.). Boston, MA: Little, Brown and Company.
3. Salm, T., Cutler, B., & Wheeler H. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.
4. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
5. Chesney, D., & Chesney, M. (1981). Radiographic imaging (4th ed.). Boston, MA: Blackwell Scientific Publications Ltd.
6. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

7. Wilkins, R., & Viamonte, M. (1982). Interventional radiology. Boston, MA: Blackwell Scientific Publications Ltd.
8. Intravenous setup.
9. Physician's order.
10. Human model.
11. Patient chart.
12. Checklist - Regulating intravenous infusion.

TEACHING ACTIVITIES:

1. Discuss method of explaining the procedure to patient. (* 1)
2. Demonstrate technique for explaining procedure to patient. (* 1)
3. Explain how to calculate number of cc's per hour to be infused and convert dose to drops per minute. (* 2,3,4,5,6,7 & 9)
4. Demonstrate how to calculate the exact number of cc`s and determine the rate of infusion. (* 2,7,8 & 9)
5. Discuss procedure for counting drip rate of drip chamber. (* 2 & 7)
6. Show students how to position watch and count drips per minute. (* 2,7,8 & 9)
7. Explain procedure for adjustment of flow meter. (* 2 & 7)
8. Show students how to adjust flow rate meter to calculated rate. (* 2,7,8 & 9)
9. Discuss method of appraising puncture site and intravenous tubing positioning. (* 1,2,3,4,5 & 6)
10. Discuss how to identify signs of infiltration or infection to vein puncture site. (* 1,2,3,4,5 & 6)
11. Demonstrate how to identify infiltration or long term IV infection of puncture site. (* 2,7,8 & 10)
12. Demonstrate how to secure intravenous tubing below puncture site. (* 2,7,8 & 10)
13. Discuss technique for recording procedure on patient's chart. (* 11)
14. Show students how to record procedure on patient's chart. (* 11)
15. Monitor students practicing regulating intravenous infusion. (* 8,9,10 & 11)
16. Assign students to regulate intravenous infusion. (* 12)

CRITERION-REFERENCED MEASURE:

The student must explain the procedure to the patient, calculate number of cc's rate of flow, set flow rate meter, assess puncture site for signs of infiltration or infection, position and secure intravenous tubing and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Check physician's order.
2. Identify patient and explain procedure.
3. Determine the number of cc's to be infused per hour and calculate drops per minute needed.
4. Hold watch with second hand behind the drip chamber.
5. Count the drops for one minute.
6. Open or close flow rate meter to adjust flow.
7. Repeat steps four and five until prescribed flow is attained.
8. Check vein puncture site for infiltration or infection.
9. Check intravenous tubing position and recoil if below vein puncture site.
10. Record procedure on patient's chart.

CHECKLIST

DUTY Performing Patient Care Services

TASK Regulate intravenous infusion.

ENABLER

1. Identify physician's orders and verify patient's identification.
2. Explain procedure to patient.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to regulate intravenous infusion.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Checked physician's order.		
2.	Identified patient and explained procedure.		
3.	Determined the number of cc's to be infused per hour and calculated drops per minute needed.		
4.	Held watch with second hand behind the drip chamber.		
5.	Counted the drops for one minute.		
6.	Opened or closed flow rate meter to adjust flow.		
7.	Repeated steps four and five until prescribed flow is attained.		
8.	Checked vein puncture site for infiltration or infection.		
9.	Checked intravenous tubing position and recoiled if below vein puncture site.		
10.	Recorded procedure on patient's chart.		

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 56

TASK: Record physical statistics of patient.

STANDARD OF PERFORMANCE OF TASK:

The scales must be balanced, stationary and paper towel in place. The patient's height and weight must be recorded on patient's chart.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Paper towel
Patient's chart
Stationary scale with measurement bar

ENABLING OBJECTIVES:

1. Identify patient and obtain patient's chart.
2. Review established department procedures for recording physical statistics of patient.

***RESOURCES:**

1. Department policy/procedure manual.
2. Alpert, J., & Wittenburg, S. (1986). Clinicians companion: A study guide for effective and human patient care. Boston, MA: Little, Brown and Company.
3. Vanders, S., Thomas, J., Cutler, B., & Wheeler, H. (1987). Atlas of bedside procedures. Boston, MA: Little, Brown and Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
5. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
6. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
7. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.

***RESOURCES:** (cont.)

8. Scale with measurement bar.
9. Patient chart.
10. Checklist - Recording physical statistics of patient.

TEACHING ACTIVITIES:

1. Review the procedure for identifying the patient. (* 1)
2. Explain how to prepare scale for patient. (* 1,2 & 3)
3. Demonstrate how to prepare scale for patient. (* 8)
4. Discuss how to prepare patient before they step onto the scale. (* 1)
5. Show how to assist patient onto the scale. (* 8)
6. Conduct class discussion stressing that the patient should not be holding on to the scale and remain as motionless as possible. (* 1 & 7)
7. Show students the procedure for taking patient's weight and height. (* 1,6 & 7)
8. Stress the importance of having the patient stand as erect as possible while being measured for height.
9. Show students how to assist patient off the scale.
10. Explain how to clean scale and return scale weights to their usual position. (* 8)
11. Review how to record patient's statistics on the patient's chart. (* 1 & 9)
12. Demonstrate procedure for recording statistics on patient's chart. (* 9)
13. Monitor students practicing taking and recording patient's physical statistics. (* 8 & 9)
14. Assign students to record patient's physical statistics. (* 10)

CRITERION-REFERENCED MEASURE:

The student must prepare the scale, weigh the patient, measure patient's height, and record statistics on patient's chart.

PERFORMANCE GUIDE:

1. Identify patient and explain procedure.
2. Balance scale and raise measurement bar.
3. Place a paper towel on scale platform.
4. Assist patient onto scale.
   NOTE: Have patient remove shoes or slippers.

PERFORMANCE GUIDE: (cont.)

5. Steady patient if necessary.
   NOTE: Patient must not be leaning on or holding scale supports during measurements.
6. Balance scale bar and record patient's weight.
7. Adjust measure bar to top of patient's head and record height.
   NOTE: Have patient stand as erect as possible.
8. Assist patient from scales and dispose of towel.
9. Return scale weights to left and lower measurement bar.
10. Record physical statistics on the patient's chart.

CHECKLIST

DUTY Performing Patient Care Services

TASK Record physical statistics of patient.

ENABLER

1. Identify patient and obtain patient's chart.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to record physical statistics of patient.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Identified patient and explained procedure.		
2.	Balanced scale and raised measurement bar.		
3.	Placed a paper towel on scale platform.		
4.	Assisted patient onto scale.		
5.	Steadied patient if necessary.		
6.	Balanced scale bar and recorded patient's weight.		
7.	Adjusted measure bar to top of patient's head and recorded height.		
8.	Assisted patient off scales and disposed of towel.		
9.	Returned scale weights to left and lowered measurement bar.		
10.	Recorded physical statistics on the patient's chart.		

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 57

TASK: Disconnect intravenous infusion.

STANDARD OF PERFORMANCE OF TASK:

The intravenous infusion must be disconnected using aseptic technique. Oozing from puncture site must be monitored and a bandage, pressure bandage, or direct pressure must be applied to puncture site.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Bandage
Alcohol swab
Patient's identification
Patient's chart
Running intravenous infusion

ENABLING OBJECTIVES:

1. Locate patient's chart and verify physician's orders.
2. Assemble materials needed for intravenous infusion disconnection.
3. Review established department procedure for disconnecting intravenous infusion.

***RESOURCES:**

1. Department policy/procedure manual.
2. Plumer, A. (1987). Principles and practice of intravenous therapy (4th ed.). Boston, MA: Little, Brown and Company.
3. Salm, T., Cutler, B., & Wheeler H. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.
4. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
5. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.

***RESOURCES:** (cont.)

6. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
7. Wilkins, R., & Viamonte, M. (1982). Interventional radiology. Boston, MA: Blackwell Scientific Publications Ltd.
8. Set up intravenous infusion.
9. Intravenous infusion disconnect tray.
10. Human model.
11. Patient's chart.
12. Physician's order.
13. Checklist - Disconnecting intravenous infusion.

TEACHING ACTIVITIES:

1. Review procedure for identifying patient and explaining procedure. (* 1,11 & 12)
2. Conduct class discussion on aseptic technique stressing the necessity for washing hands prior to procedure. (* 3,4,5 & 6)
3. Show how to close the clamp to stop the intravenous flow. (* 2,7 & 8)
4. Demonstrate how to remove tape that covers the intravenous puncture site.
5. Discuss and demonstrate how to place a clean alcohol swab over the puncture site. (* 2,7,8,9 & 10)
6. Explain and demonstrate the procedure for removing the needle from the puncture site. (* 2 & 7)
7. Conduct a class discussion on how to apply pressure to puncture site after needle removal. (* 2 & 7)
8. List ways that are available for disposing of needles and stress the importance of proper disposal. (* 2,3,4,5,6 & 7)
9. Explain procedures for storing reusable equipment used and how to discard disposal items. (* 1)
10. Review how to chart patient's procedures. (* 11)
11. Demonstrate how to record procedure on patient's chart. (* 11)
12. Monitor student's practicing disconnecting intravenous infusion. (* 8,9,10,11 & 12)
13. Assign students to disconnect intravenous infusion. (* 13)

CRITERION-REFERENCED MEASURE:

The student must verify patient identification and physician's orders, stop intravenous infusion flow, remove intravenous infusion needle from patient's

CRITERION-REFERENCED MEASURE: (cont.)

arm, apply band-aid/bandage on puncture site, discard disposable items, store reusable intravenous infusion equipment and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Identify patient and explain procedure.
2. Wash hands.
3. Close clamp to stop intravenous infusion flow.
4. Remove tape and expose intravenous infusion puncture site.
5. Place alcohol swab over puncture site.
6. Remove needle maintaining gentle pressure over puncture site.
   NOTE: Check site for oozing after 3 minutes. Recheck site every 3 minutes until oozing stops.
7. Apply bandage, pressure bandage, or direct pressure over puncture site.
8. Discard needle in approved container.
9. Store intravenous infusion pole and other reusable equipment.
10. Discard disposables and chart time intravenous infusion was disconnected.

CHECKLIST

DUTY Performing Patient Care Services

TASK Disconnect intravenous infusion.

ENABLER

1. Locate patient's chart and verify physician's orders.
2. Assemble materials needed for intravenous infusion disconnection.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to disconnect intravenous infusion.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Identified patient and explained procedure.	______	______
2.	Washed hands.	______	______
3.	Closed clamp to stop intravenous infusion flow.	______	______
4.	Removed tape and exposed intravenous infusion puncture site.	______	______
5.	Placed alcohol swab over puncture site.	______	______
6.	Removed needle maintaining gentle pressure over puncture site.	______	______
7.	Applied bandage, pressure bandage, or direct pressure over puncture site.	______	______
8.	Discard needle in approved container.	______	______
9.	Stored intravenous infusion pole and other reusable equipment.	______	______
10.	Discarded disposables and charted time intravenous infusion was disconnected.	______	______

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 58

TASK: Prepare patient for examination/treatment.

STANDARD OF PERFORMANCE OF TASK:

All radio-opaque materials must be removed from area to be examined/treated. The patient must be gowned or have examination/treatment area bare. The patient must be provided privacy and be covered with a sheet until examination/treatment begins.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's orders
Patient's identification
Examination room
Examination gown
Examination table/chair

ENABLING OBJECTIVES:

1. Verify patient's identification and physician's orders.
2. Locate patient and escort to examination room.
3. Review established department policy/procedure for preparing patient for examination/treatment.

***RESOURCES:**

1. Department policy/procedure manual.
2. Alpert, J., & Wittenburg, S. (1986). Clinicians companion: A study guide for effective and human patient care. Boston, MA: Little, Brown and Company.
3. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.

***RESOURCES:** (cont.)

5. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
6. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
7. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.
8. Examination room.
9. Examples of radio-opaque materials.
10. Checklist - Preparing patient for examination.

TEACHING ACTIVITIES:

1. Discuss how to assess the patient's physical condition. (* 1,2,4,5 & 7)
2. Discuss common types of radio-opaque materials that must be removed from patients. (* 1,4,5,6 & 7)
3. Show students common types of radio-opaque materials and their effects on a radiograph. (* 4,5,6,7 & 9)
4. Discuss and demonstrate how to explain the procedure to the patient and type of articles to be removed. (* 1,3,4,5,6 & 7)
5. Demonstrate how to instruct a patient to don an examination gown and what to do with clothing and valuables. (* 1,3,4 & 5)
6. Conduct a class discussion on the importance of providing and maintaining patient's privacy. (* 1)
7. Discuss pre-examination procedures including patient information and patient consent forms. (* 1,4,5,6 & 7)
8. Demonstrate procedure for obtaining patient information and patient's consent. (* 1)
9. Discuss and demonstrate method for making patient comfortable and at ease until physician arrives for examination. (* 1,3,4,5 & 6)

10 Monitor student's practicing preparing a patient for examination. (* 8 & 9)

11. Assign student to prepare a patient for an examination. (* 10)

CRITERION-REFERENCED MEASURE:

The student must assess the patient's physical condition, explain the procedure to patient, aid patient in identifying and removing radio-opaque

CRITERION-REFERENCED MEASURE: (cont.)

materials, donning examination gown, obtain patient information and consent for exam/treatment, and assure patient's privacy and comfort.

PERFORMANCE GUIDE:

1. Greet and identify patient.
2. Check physician's order for type of examination or treatment.
3. Determine patient's physical ability.
4. Instruct patient to remove any radio-opaque material over area to be examined/treated.
   NOTE: Bandages, splints, and supports should be removed only with physician's orders.
5. Instruct patient to put on examination gown when necessary:
   A. Explain how patient is to don gown.
   B. Explain what patient is to do with clothing and valuables.
   C. Assist patient in removing clothing and donning gown if necessary.
6. Perform pre-examination preliminaries:
   A. Obtain patient's pertinent medical history.
   B. Have patient sign consent forms.
7. Position patient on examination table/chair.
8. Cover patient with a sheet and assure patient's comfort/privacy.

CHECKLIST

DUTY Performing Patient Care Services

TASK Prepare patient for examination/treatment.

ENABLER

1. Verify patient's identification and physician's orders.
2. Locate patient and escort to examination room.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare patient for examination treatment.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Greeted and identified patient.		
2.	Checked physician's order for type of examination or treatment.		
3.	Determined patient's physical ability.		
4.	Instructed patient to remove any radio-opaque material from area to be examined/treated.		
5.	Instructed patient to put on examination gown when necessary.		
6.	Explained how patient is to don gown.		
7.	Explained what patient is to do with clothing and valuables.		
8.	Assisted patient in removing clothing and donning gown if necessary.		
9.	Performed pre-examination preliminaries.		
10.	Obtained patient's pertinent medical history.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
11.	Had patient sign consent forms.	________	________
12	Positioned patient on examination table/chair.	________	________
13.	Covered patient with a sheet and assure patient's comfort/privacy.	________	________

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 59

TASK: Change patient's bandage/dressing.

STANDARD OF PERFORMANCE OF TASK:

The wound, incision, or treatment area must be clean and sterile dressing must be taped in place. Sterile technique must be maintained throughout the procedure and the procedure must be recorded on patient's chart.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Patient's identification
Sterile gloves
Examination gloves
Sterile dressing
Adhesive tape
Sterile procedure tray
Disposable bag

ENABLING OBJECTIVES:

1. Locate sterile procedure tray.
2. Wash hands and don examination gloves.
3. Identify patient and type of wound.
4. Review established department procedure for changing patient's dressing.

***RESOURCES:**

1. Department policy/procedure manual.
2. Klippel, A., & Anderson, C. (1979). Manual of emergency and outpatient techniques. Boston, MA: Little, Brown and Company.
3. Levy, B., & Wegman, D. (1982). Occupational health: Recognizing and preventing work-related diseases. Boston, MA: Little, Brown and Company.
4. Mandell, L., & Ralph, E. (1985). Essentials of infectious diseases. Boston, MA: Blackwell Scientific Publications Ltd.

*RESOURCES: (cont.)

5. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
6. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
7. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
8. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
9. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.
10. Sterile procedure tray and disposable bags.
11. Examination gloves.
12. Sterile gloves.
13. Patient chart.
14. Human model.
15. Checklist - Changing patient's bandage/dressing.

TEACHING ACTIVITIES:

1. Recall methods of explaining procedure to patient. (* 1 & 5)
2. Discuss positioning techniques which make bandage accessible for changing. (* 2 & 6)
3. Demonstrate patient positioning techniques. (* 2,6 & 14)
4. Discuss contents of a sterile procedure tray and aseptic procedures. (* 1,2,7,8,9 & 10)
5. Show students contents of procedure tray and stress importance of maintaining aseptic conditions. (* 10)
6. Demonstrate use of examination gloves. (* 1,7,8,9 & 11)
7. Conduct class discussion on infections disease and how their spread. (* 3 & 4)
8. Discuss procedure for removing old bandage and explain proper method of disposal of bandage. (* 1,2,7,8 & 9)
9. Conduct a class discussion on ways contamination occurs and diseases are spread. (* 3 & 4)
10. Show students how to dispose of old bandages and utilize aseptic techniques to prevent the spread of germs. (* 1,2,7,8 & 9)

TEACHING ACTIVITIES: (cont.)

11. Demonstrate procedure for removing examination gloves and disposing of them. (* 1,2,7 & 8)
12. Review method for washing hands aseptically and donning sterile gloves. (* 1,2,3,4 & 12)
13. Demonstrate how to cleanse a wound and apply a sterile bandage. (* 2,7,8,9,10 & 14)
14. Show students how to secure bandage in place. (* 2,10 & 14)
15. Review procedure for removing and disposing of gloves. (* 1,2,7 & 8)
16. Review procedure for recording process on patient's chart. (* 1 & 13)
17. Monitor students practicing changing patient's bandage/dressing. (* 10,11,12,13, & 14)
18. Assign students to change patient's bandage/dressing. (* 15)

CRITERION-REFERENCED MEASURE:

The student must position patient so bandage is accessible, don examination gloves, remove old bandage, dispose of bandage and examination gloves, don sterile gloves, cleanse wound, apply sterile bandage and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Identify patient and explain procedure.
2. Assemble equipment and wash hands.
3. Don examination gloves.
4. Position patient, remove old dressing and place in disposable bag.
5. Remove and dispose of examination gloves.
6. Wash hands and put on sterile gloves.
7. Inspect area to be dressed and cleansed if necessary.
8. Apply sterile dressing and place on area to be dressed.
9. Tape sterile dressing in place.
10. Remove gloves and place in disposable bag.
11. Clean and return equipment to storage.
12. Clean work area.
13. Record procedure on patient's chart.

CHECKLIST

DUTY Performing Patient Care Services

TASK Change patient's bandage/dressing.

ENABLER

1. Locate sterile procedure tray.
2. Wash hands and don examination gloves.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to change patient's bandage/dressing.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Identified patient and explained procedure.		
2.	Assembled equipment and washed hands.		
3.	Donned examination gloves.		
4.	Positioned patient, removed old dressing and placed in disposable bag.		
5.	Removed and disposed of examination gloves.		
6.	Washed hands and put on sterile gloves.		
7.	Inspected area to be dressed and cleansed if necessary.		
8.	Applied sterile dressing and placed on area to be dressed.		
9.	Taped sterile dressing in place.		
10.	Removed gloves and placed in disposable bag.		
11.	Cleaned and returned equipment to storage.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
12. Cleaned work area.		
13. Recorded procedure on patient's chart.		

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 60

TASK: Fill patient's bladder.

STANDARD OF PERFORMANCE OF TASK:

Patient's bladder must be sufficiently filled to yield desired diagnostic volume. Comfort, safety, and aseptic technique must be maintained.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Clamp
Stable hanger
Collecting basin
Catheterized patient
Sterile hypo-allergenic solution

ENABLING OBJECTIVES:

1. Assemble equipment needed for filling patient's bladder.
2. Verify that patient is catheterized.
3. Review established department policy/procedure for filling patient's bladder.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Vanders, S., Thomas, J., Cutler, B., & Wheeler, H. (1987). Atlas of bedside procedures. Boston, MA: Little, Brown and Company.
4. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
5. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.

***RESOURCES:** (cont.)

6. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
7. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
8. Stable hanger.
9. Sterile solution.
10. Patient's chart.
11. Checklist - Filling patient's bladder.

TEACHING ACTIVITIES:

1. Review and demonstrate procedure for identifying patient's identity, checking physician's orders and establishing rapport with patient. (* 1 & 2)
2. Discuss the location and identification of different types sterile solution. (* 1 & 9)
3. Show proper way to hang sterile solution on hanger and place in area by patient's feet. (* 3,5,6,8 & 9)
4. Demonstrate procedure to remove air from connecting tube allowing solution to flow through. (* 3,5,6,8 & 9)
5. Explain and demonstrate aseptic method for connecting tubing to catheter. (* 3,4,7 & 8)
6. Demonstrate how to regulate flow rate according to patient's condition and comfort. (* 3,4,6 & 8)
7. Explain and demonstrate how to clamp catheter and remove urine prior to filling. (* 3,4 & 8)
8. Review department procedure for notifying physician of patient's condition and recording procedure on patient's chart. (* 1 & 10)
9. Observe student's practice of filling patient's bladder. (* 8 & 9)
10. Evaluate student's performance while filling patient's bladder. (* 11)

CRITERION-REFERENCED MEASURE:

The student must identify type of sterile solution to be used, hang solution on stable hanger, position solution by patient's feet, connect solution tubing to catheter, regulate flow of solution into bladder, clamp catheter, notify physician of patient's condition, and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Identify patient, check physician's orders, and instruct the patient on the procedure to be performed, the necessity to relax, and why the bladder needs to be filled.
2. Hang the sterile solution on a stable hanger at the patient's feet.
3. Remove the air from the connecting tubing attached to the sterile solution.
4. Connect and infuse the solution via the urinary catheter, maintaining aseptic technique.
5. Decrease the rate of flow until the flow of the solution ceases.
6. Clamp the catheter to prevent leakage and back flow into the solution container.
7. Proceed with the exam or notify the physician of the patient's state.

CHECKLIST

DUTY Performing Patient Care Services

TASK Fill patient's bladder.

ENABLER

1. Assemble equipment needed for filling patient's bladder.
2. Verify that patient is catheterized.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to fill patient's bladder.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Identified patient, checked physician's orders, and instructed the patient on the procedure to be performed, the necessity to relax, and why the bladder needs to be filled.		
2.	Hung the sterile solution on a stable hanger at the patient's feet.		
3.	Removed the air from the connecting tubing attached to the sterile solution.		
4.	Connected and infused the solution via the urinary catheter, and maintained aseptic technique.		
5.	Decreased the rate of flow until the flow of the solution ceased.		
6.	Clamped the catheter to prevent leakage and back flow into the solution container.		
7.	Proceeded with the exam or notified the physician of the patient's state.		

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO: 61

TASK: Handle a patient with a spine or skull injury.

STANDARD OF PERFORMANCE OF TASK:

The patient must be prepared for treatment or examination using a minimal amount of movement and without further injury to patient.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Assistant
Patient's chart
Physician's orders
Immobilization devices

ENABLING OBJECTIVES:

1. Review patient chart.
2. Recall implications of patient's injury.
3. Arrange for an assistant to be present.
4. Review established department protocol for handling a patient with a spine or skull injury.

***RESOURCES:**

1. Department policy/procedure manual.
2. Caroline, N. (1987). Emergency medical treatment (2nd ed.). Boston, MA: Little, Brown and Company.
3. Salm, T., Cutler, B., & Wheeler H. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.
4. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
5. Skeet, M. (1987). Emergency procedures and first aid for nurses. Boston, MA: Blackwell Scientific Publications Ltd.
6. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

7. Bergeron, T., Osborn, G., & Som, P. (1983). Head and neck imaging. St. Louis, MO: C.V. Mosby Company.
8. Immobilization devices.
9. Human model.
10. Checklist - Handling patient with spine or skull injury.

TEACHING ACTIVITIES:

1. Review procedure for verifying patient's identification and physician's order. (* 1)
2. Discuss types of immobilization devices and explain their operation. (* 2,3,6 & 7)
3. Demonstrate the operation of immobilization devices. (* 8 & 9)
4. Show students how to verify that immobilization devices are correctly administered and secured. (* 2,3,6 & 7)
5. Explain how to pre-plan patient preparation to utilize a minimum of patient movement and how to inform patient of your intention. (* 1 & 4)
6. Demonstrate procedure for preparing patient with assistant help and minimal patient movement (* 1 & 9)
7. Discuss and demonstrate method for checking patient's vital signs. (* 2,3,5,6 & 7)
8. Conduct class discussion on signs of stress and importance of monitoring patient at all times. (* 1 & 7)
9. Explain how to detect signs of undue stress. (* 2,3,5 & 7)
10. Observe students practicing handling a patient with a spine or skull injury. (* 9)
11. Assign student to handle a patient with a spine or skull injury and evaluate student's performance. (* 10)

CRITERION-REFERENCED MEASURE:

The student must verify immobilization devices administration, plan patient preparation, prepare for treatment or examination, and monitor patient's condition for signs of stress.

PERFORMANCE GUIDE:

1. Identify patient.
2. Determine location and nature of patient's injury.
3. Verify physician's orders.

PERFORMANCE GUIDE: (cont.)

4. Verify that immobilization devices are correctly administered and secured.
5. Complete examination/treatment preparations possible without moving patient.
6. Complete minimal preparations which require moving the patient with the assistance of another technologist.
7. Check patient's vital signs.
8. Observe patient for undue stress:
   - A. Changes in breathing.
   - B. State of consciousness.
   - C. Changes in color.
   - D. Bleeding.

   CAUTION: Never leave patient unattended.

CHECKLIST

DUTY Performing Patient Care Services

TASK Handle a patient with a spine or skull injury.

ENABLER

1. Review patient chart.
2. Recall implications of patient's injury.
3. Arrange for an assistant to be present.

STUDENT'S NAME________________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to handle a patient with a spine or skull injury.

PERFORMANCE DETERMINANTS	YES	NO
1. Identified patient.		
2. Determined location and nature of patient's injury.		
3. Verified physician's orders.		
4. Verified that immobilization devices were correctly administered and secured.		
5. Completed examination/treatment preparations possible without moving patient.		
6. Completed minimal preparations which required moving the patient with the assistance of another technologist.		
7. Checked patient's vital signs.		
8. Observed patient for undue stress.		

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 62

TASK: Position bedpan or urinal for patient.

STANDARD OF PERFORMANCE OF TASK:

The patient must be provided with a bedpan or urinal and if incapacitated the bedpan or urinal must be positioned, removed and emptied.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Bedpan
Urinal
Sheet
Commode
Toilet tissue
Gloves

ENABLING OBJECTIVES:

1. Determine mobility of patient.
2. Identify any exams requiring samples.
3. Identify location of bedpans and urinal.
4. Review established department procedure for positioning bedpan or urinal.

*RESOURCES:

1. Department policy/procedure manual.
2. Vanders, S., Thomas, J., Cutler, B., & Wheeler, H. (1987). Atlas of bedside procedures. Boston, MA: Little, Brown and Company.
3. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
4. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
5. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
6. Bedpan/urinal.
7. Human model.

***RESOURCES:** (cont.)

8. Checklist - Positioning bedpan or urinal for patient.

TEACHING ACTIVITIES:

1. Review how to assess a patient's condition to determine if assistance with urinal or bedpan is needed. (* 1)
2. Discuss and demonstrate methods for providing privacy to a patient not needing assistance with positioning bedpan or urinal. (* 2,3,4 & 5)
3. Explain procedure for positioning bedpan or urinal for an incapacitated patient. (* 1,2,3 & 4)
4. Show students how to don gloves and position a bedpan for an incapacitated patient. (* 2,3,4,6 & 7)
5. Show students how to position a urinal for a incapacitated patient. (* 2,3,4,6 & 7)
6. Review methods of providing patient privacy. (* 2,3,4 & 5)
7. Explain procedure for removing a bedpan or urinal and disposing of wastes. (* 1,2,3 & 4)
8. Demonstrate how to remove bedpan and dispose of waste. (* 2,3,6 & 7)
9. Demonstrate how to remove urinal and dispose of waste. (* 2,3,6 & 7)
10. Discuss and demonstrate procedure for cleaning a patient after removing bedpan. (* 1,2,3 & 7)
11. Show students how to clean bedpan or urinal and return to storage. (* 2,3 & 6)
12. Review method of washing hands and arms aseptically prior to continuing procedure. (* 1,2,3,4 & 5)
13. Observe students practicing positioning bedpan or urinal. (* 6 & 7)
14. Evaluate students while positioning bedpan or urinal for patient. (* 8)

CRITERION-REFERENCED MEASURE:

The student must assess the patient's condition, position bedpan or urinal for incapacitated patients, remove bedpan or urinal, dispose of waste materials, clean bedpan or urinal, store bedpan or urinal, clean patient, and wash hands and arms aseptically prior to continuing procedures.

PERFORMANCE GUIDE:

1. Check patient's chart for exams or samples requiring a specimen.
2. Obtain bedpan or urinal from storage area.

PERFORMANCE GUIDE: (cont.)

3. Give patient urinal or bedpan.
4. Don gloves and position bedpan or urinal for incapacitated patient:
   A. Urinal:
      1. Position penis inside of urinal so urine flows into the urinal.
      2. Place urinal firmly between patient's legs to avoid spillage.
   B. Bedpan:
      1. Position bedpan squarely beneath patient's buttocks.
      2. Check to ensure that bedpan is level.
5. Cover patient with a sheet to ensure privacy.
   CAUTION: Do not leave patient unattended if condition dictates close observation.
6. Remove bedpan or urinal and clean patient as necessary.
7. Dispose of excreted material into commode and clean the bedpan or urinal.
8. Return bedpan or urinal to storage area.
9. Take off gloves and wash hands.

CHECKLIST

DUTY Performing Patient Care Services

TASK Position bedpan or urinal for patient.

ENABLER

1. Determine mobility of patient.
2. Identify any exams requiring samples.
3. Recall location of bedpans and urinal.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to position bedpan or urinal for patient.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Checked patient's chart for exams or samples requiring a specimen.	______	______
2.	Obtained bedpan or urinal from storage area.	______	______
3.	Donned gloves and gave patient urinal or bedpan.	______	______
4.	Positioned bedpan or urinal for incapacitated patient.	______	______
5.	Positioned penis inside of urinal so urine flowed into the urinal.	______	______
6.	Placed urinal firmly between patient's legs to avoid spillage.	______	______
7.	Positioned bedpan squarely beneath patient's buttocks.	______	______
8.	Checked to ensure that bedpan was level.	______	______
9.	Covered patient with a sheet and ensured privacy.	______	______
10.	Removed bedpan or urinal and cleaned patient as necessary.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
11. Disposed of excreted material into commode and cleaned the bedpan or urinal.	________	________
12. Returned bedpan or urinal to storage area.	________	________
13. Removed gloves and washed hands and arms.	________	________

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 63

TASK: Provide assistance for a vomiting patient.

STANDARD OF PERFORMANCE OF TASK:

The patient, positioned with head to one side if lying down, must be provided with an emesis basin, a cold compress, suctioned, if necessary, and instructed to breathe through the mouth, if not actively vomiting.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Emesis basin
Cold compress
Kleenex or paper towel

ENABLING OBJECTIVES:

1. Recognize physical limitations of patient.
2. Recall dangers associated with vomiting.
3. Identify symptoms of a nauseated patient.
4. Review established department procedure for assisting a vomiting patient.

***RESOURCES:**

1. Department policy/procedure manual.
2. Vanders, S., Thomas, J., Cutler, B., & Wheeler, H. (1987). Atlas of bedside procedures. Boston, MA: Little, Brown and Company.
3. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
4. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
5. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
6. Emesis basin.

*RESOURCES: (cont.)

7. Cold compress.
8. Suction device.
9. Checklist - Assisting a vomiting patient.

TEACHING ACTIVITIES:

1. Explain and demonstrate position of vomiting patient on their side or turning head to one side. (* 1,2 & 5)
2. Review location of emesis basin. (* 1)
3. Show students how to situate patients an emesis basin and help them position the basin. (* 4,5 & 6)
4. Explain proper procedure for handling vomiting patient. (* 2,4 & 5)
5. Review location of towels. (* 1)
6. Explain and demonstrate procedure for cleaning patient's face and providing cold compress for patient's forehead. (* 2,3,4 & 7)
7. Review location of suction device. (* 1 & 8)
8. Explain and demonstrate how to use suction. (* 1 & 3)
9. Observe student's practice of assisting vomiting patient. (* 6,7 & 8)
10. Evaluate students' performance in providing assistance to vomiting patient. (* 9)

CRITERION-REFERENCED MEASURE:

The student must position patient and emesis basin, clean patient, provide cold compress for patient's forehead and utilize suction device if necessary.

PERFORMANCE GUIDE:

1. Turn patient on side or turn patient's head to one side, if patient is lying down.
2. Provide an emesis basin.
3. Instruct patient to breathe through mouth if patient is only nauseated.
   NOTE: Do not instruct patient who is vomiting to breathe through mouth.
4. Wipe mouth with kleenex.
5. Apply cold compress (towel) or wipe forehead.
6. Suction mouth if necessary to prevent aspirating vomitus.

CHECKLIST

DUTY Performing Patient Care Services

TASK Provide assistance for a vomiting patient.

ENABLER

1. Recognize physical limitations of patient.
2. Recall dangers associated with vomiting.
3. Identify symptoms of a nauseated patient.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to provide assistance for a vomiting patient.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Turned patient on side or turned patient's head to one side, if patient was lying down.		
2.	Provided an emesis basin.		
3.	Instructed patient to breathe through mouth, if patient was only nauseated.		
4.	Wiped mouth with kleenex.		
5.	Applied cold compress (towel) or wiped forehead.		
6.	Suctioned mouth if necessary to prevent aspirating vomitus.		

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 64

TASK: Assess basic first aid needs of patient.

STANDARD OF PERFORMANCE OF TASK:

Patient's injury must be assessed to determine basic first aid needed to stabilize injury until assistance can arrive. Physician or RN must be called and the nature of incident and treatment must be documented on an institutional incident form.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient requiring first aid
Basic first aid equipment
Institutional "incident form"

ENABLING OBJECTIVES:

1. Recall basic first aid procedures.
2. Review established department policy/procedure for assessing basic first aid needs.

***RESOURCES:**

1. Department policy/procedure manual.
2. American Red Cross. (1981). Standard first aid and personal safety (3rd ed.). American National Red Cross: United States of America.
3. Caroline, N. (1987). Emergency medical treatment. Boston, MA: Little, Brown and Company.
4. Eckert, C. (1981). Emergency-room care (4th ed.). Boston, MA: Little, Brown and Company.
5. Jenkins, J., & Loscalzo, J. (1986). Manual of emergency medicine. Boston, MA: Little, Brown and Company.
6. Skeet, M. (1987). Emergency procedures and first aid for nurses. Boston, MA: Blackwell Scientific Publications Ltd.
7. Basic first aid supplies.
8. Incident form.

***RESOURCES:** (cont.)

9. Checklist - Assessing basic first aid needs.

TEACHING ACTIVITIES:

1. Conduct classroom discussion on procedure for assessing first aid needs of patient. (* 1,2,3,4 & 5)
2. Review and demonstrate the basic steps of first aid for stabilizing the specific injury. (* 2,3,4,5 & 6)
3. Identify department procedure for notifying physician and documenting incident and treatment on given institutional incident form. (* 1,5,6 & 7)
4. Demonstrate how to fill in institutional incident form. (* 1 & 7)
5. Monitor students as they practice assessing basic first aid needs. (* 7 & 8)
6. Supervise and evaluate students while they assess a patient's first aid needs. (* 9)

CRITERION-REFERENCED MEASURE:

The student must assess the patient's injury, stabilize the injury, notify attending physician of incident and steps followed, and document incident and treatment on incident form.

PERFORMANCE GUIDE:

1. Assess the patient's injury.
2. Perform basic steps of first aid for stabilizing the specific injury.
   NOTE: See American Red Cross Basic First Aid manual for specific steps to follow. A basic course in first aid is mandatory for all Allied Health related positions.
3. Notify attending physician of incident and steps performed.
4. Assist as needed with patient follow-up.
5. Document incident and treatment given on institutional incident form.

CHECKLIST

DUTY Performing Patient Care Services

TASK Assess basic first aid needs of patient.

ENABLER

1. Recall basic first aid procedures.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to assess basic first aid needs of patient.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Assessed the patient's injury.	______	______
2.	Performed basic steps of first aid for stabilizing the specific injury.	______	______
3.	Notified attending physician of incident and steps performed.	______	______
4.	Assisted as needed with patient follow-up.	______	______
5.	Documented incident and treatment given on institutional incident form.	______	______

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 65

TASK: Administer cardiopulmonary resuscitation to a patient with cardiac arrest.

STANDARD OF PERFORMANCE OF TASK:

External cardiac compression must be performed using the single rescuer and two rescuer methods. The patient must be correctly positioned. Hands must be correctly positioned and the compression ventilation ratio must be 15:2 for single rescuer and 5:1 for two rescuers. CPR must continue until patient is breathing or released to physician's care.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Assistant
Patient with cardiac arrest

ENABLING OBJECTIVES:

1. Verify that cardiac arrest has occurred.
2. Review procedure for calling for assistance.
3. Recall methods for single rescuer and for two rescuers.
4. Make note of time arrest occurred and CPR started.
5. Review established department procedure for administering CPR to a patient.

***RESOURCES:**

1. Department policy/procedure manual.
2. American Red Cross. (1981). Standard first aid and personal safety (3rd ed.). American National Red Cross: United States of America.
3. Caroline, N. (1987). Emergency medical treatment. Boston, MA: Little, Brown and Company.
4. Eckert, C. (1981). Emergency-room care (4th ed.). Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

5. Jenkins, J., & Loscalzo, J. (1986). Manual of emergency medicine. Boston, MA: Little, Brown and Company.
6. Skeet, M. (1987). Emergency procedures and first aid for nurses. Boston, MA: Blackwell Scientific Publications Ltd.
7. Watch.
8. CPR assistant.
9. Resuscitation model.
10. Checklist - Administering CPR.

TEACHING ACTIVITIES:

1. Identify how to summon assistance if patient is unresponsive. (* 1,5 & 6)
2. Explain and demonstrate how to position patient for CPR. (* 2,3,4,5 & 6)
3. Review and demonstrate the steps for ventilating patient mouth to mouth. (* 2,3,4 & 9)
4. Show students how to check for pulse at carotid artery. (* 1 & 8)
5. Explain and show students how to perform single rescuer CPR. (* 2,3,4,5,6 & 9)
6. Explain and show students how to perform two rescuers CPR. (* 2,3,4,5,6,8 & 9)
7. Conduct class discussion on how long to continue CPR procedure. (* 1,2 & 3)
8. Monitor students as they practice administering cardiopulmonary resuscitation to a patient with cardiac arrest. (* 7,8 & 9)
9. Evaluate and supervise students administering cardiopulmonary resuscitation to a patient with cardiac arrest. (* 10)

CRITERION-REFERENCED MEASURE:

The student must summon assistance, verify that cardiac arrest has occurred, note time when arrest occurred and CPR procedure began, perform single rescuer or two rescuer CPR, and continue CPR until patient is breathing on their own or released to physician care.

PERFORMANCE GUIDE:

1. Establish unresponsiveness and summon assistance.
2. Position patient on back (on hard surface, if available).

PERFORMANCE GUIDE: (cont.)

3. Tilt patient's head backward to open air passage.
4. Look for chest movement.
5. Listen for air movement at nose and mouth.
6. Ventilate patient by mouth-to-mouth method.
7. Confirm pulselessness at carotid artery.
8. Perform single rescuer CPR:
    A. Locate pressure point (landmark).
    B. Place heel of one hand over pressure point (landmark).
    C. Place heel of other hand over back of first hand.
    D. Compress lower half of mid-sternum between 1-1/2" and 2".
    E. Compress and ventilate at 15:2 ration, maintaining rate of 80 compressions per minute.
9. Perform two rescuers CPR:
    A. Compress sternum five times, at rate of one per second. (Performed by first rescuer.)
    B. Interpose one ventilation during fifth upstroke. (Performed by second rescuer).
    C. Alternate positions as needed without interruption.
10. Continue CPR procedure until patient is breathing or released to physician care.

CHECKLIST

DUTY Performing Patient Care Services

TASK Administer cardiopulmonary resuscitation to a patient with cardiac arrest.

ENABLER

1. Verify that cardiac arrest has occurred.
2. Review procedure for calling for assistance.
3. Recall methods for single rescuer and for two rescuers.
4. Make note of time arrest occurred and CPR started.

STUDENT'S NAME ____________________ DATE __________

EVALUATOR'S NAME ____________________ COURSE __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to administer cardiopulmonary resuscitation to a patient with cardiac arrest.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Established unresponsiveness and summoned assistance.		
2.	Positioned patient on back (on hard surface, if available).		
3.	Tilted patient's head backward to open air passage.		
4.	Looked for chest movement.		
5.	Listened for air movement at nose and mouth.		
6.	Ventilated patient by mouth-to-mouth method.		
7.	Confirmed pulselessness at carotid artery.		
8.	Performed single rescuer CPR:		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Located pressure point (landmark):		
- Placed heel of one hand over pressure point (landmark).	________	________
- Placed heel of other hand over back of first hand.	________	________
- Compressed lower half of mid-sternum between 1-1/2" and 2".	________	________
- Compressed and ventilated at 15:2 ration, maintaining rate of 80 compressions per minute.	________	________
10. Performed two rescuers CPR:		
- Compressed sternum five times, at rate of one per second. (Performed by first rescuer.)	________	________
- Interposed one ventilation during fifth upstroke. (Performed by second rescuer).	________	________
- Alternated positions as needed without interruption.	________	________
- Continued CPR procedure until patient was breathing or released to physician care.	________	________

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 66

TASK: Administer artificial ventilation to a patient.

STANDARD OF PERFORMANCE OF TASK:

Artificial ventilation for an unconscious adult must be administered at the rate of one ventilation every five seconds. Artificial ventilation for an unconscious infant must be administered at a rate of approximately 20 breaths per minute. Resuscitation must continue until patient is breathing spontaneously or released to care of physician. Procedure must be recorded on patient's chart.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Unconscious patient

ENABLING OBJECTIVES:

1. Establish if respiratory arrest has occurred.
2. Identify artificial ventilation procedures for an adult.
3. Identify artificial ventilation procedures for an unconscious infant.

*RESOURCES:

1. American Red Cross. (1981). Standard first aid and personal safety. Washington, D.C.: Library of Congress.
2. American Medical Association. (1980). Handbook of first aid and emergency care. New York, N.Y.: Random House.
3. U.S.Department of Labor. (1980). First aid book. Washington D.C.: U.S. Government Printing Office.

RESOURCES: (cont.)

4. Judd, R. and Ponsell, D. (1982). The first responder: "The critical first minutes." St. Louis: C.V. Mosby Company.
5. Hafen, B. First aid and emergency care skill manuals. Englewood, CO: Morton Publishing Company.
6. Life indicator locations list.
7. Artificial ventilation procedure list.
8. Child resuscitation model.
9. Adult resuscitation model.
10. Film - Performing artificial ventilation.
11. Checklist - Assessing the respiratory emergency.
12. Checklist - Artificial ventilation procedure for an unconscious infant.
13. Checklist - Artificial ventilation procedure for an adult.

TEACHING ACTIVITIES:

1. Present lecture on assessing the respiratory emergency. (* 1,2,3,4,5 & 6)
2. Conduct group discussion on causes of respiratory arrest and location of life indicator points. (* 1,2,3,4,5 & 6)
3. Instruct student to identify life indicator points on resuscitation model. (* 1,2,3,4,5,6,13 & 14)
4. Demonstrate life indicator locations to the students. (* 13 & 14)
5. Present lecture on respiratory arrest response procedures. (* 1,2,3,4,5,6 & 7)
6. Show film on performing artificial ventilation. (* 15)
7. Discuss student information sheet on types of airway obstructions. (* 2,3 & 4)
8. Conduct class discussion on patient handling and disease transmission. (* 1,2,3,4 & 5)
9. Demonstrate how to clear the oral airway. (* 6,13 & 14)
10. Instruct student to practice clearing the oral airway on the resuscitation models. (* 13 & 14)
11. Demonstrate the procedure for performing artificial ventilation on an adult. (* 1,2,3,4,5,7 & 14)
12. Instruct student to practice performing artificial ventilation on an adult resuscitation model. (* 7 & 14)
13. Demonstrate the procedure for performing artificial ventilation on an infant. (* 1,2,3,4,5,7 & 13)
14. Instruct student to practice performing artificial ventilation on an infant resuscitation model. (* 7 & 13)

TEACHING ACTIVITIES: (cont.)

15. Instruct student to assess a mock respiratory arrest emergency, clear the patient's oral airway, and perform artificial ventilation on the resuscitation model. (* 9,10,11,12,13 & 14)

CRITERION-REFERENCED MEASURE:

The student must identify life indicator locations, clear the oral airway, position the model, and perform the artificial ventilation technique appropriate for the resuscitation model (child or adult).

PERFORMANCE GUIDE:

1. Record the time the procedure was started.
2. Search for signs of breathing, pulse, and check pupils.
3. Lay patient flat on back.
4. Call for help.
5. Administer artificial ventilation to an adult patient:
    A. Check oral cavity for obstruction:
        1. Remove obstruction using index finger
    B. Place left hand under patient's neck and lift upward.
    C. Tilt patient's head backwards to open air passage:
        1. Place one hand behind patient's neck.
        2. Place other hand on patient's forehead.
        3. Lift patient's neck and tilt head so chin points almost straight up.
    D. Seal patient's nose with thumb and forefinger.
    E. Take a deep breath.
    F. Seal your mouth over patient's mouth.
    G. Blow your breath into patient's lungs.
    H. Remove your mouth and allow patient exhalation.
    I. Repeat ventilations and exhalations 12 times per minute.
6. Administer artificial ventilation to an unconscious infant:
    A. Check oral cavity for obstruction:
        1. Remove obstruction by turning infant over with head lower than body.
        2. Hit between shoulders to dislodge obstruction.
        3. Remove with fingers.
    B. Place mouth over infant's nose and mouth.

PERFORMANCE GUIDE: (cont.)

   C. Blow shallow breath into infant's mouth and nose.
   D. Remove mouth to allow infant to exhale.
   E. Repeat ventilations and exhalations at 20 shallow breaths per minute.

7. Record time, assistance, how found, patient's condition and outcome of procedure on patient's chart.
8. Notify charge nurse and physician.

CHECKLIST

DUTY Performing Patient Care Services

TASK Administer artificial ventilation to a patient.

ENABLER

1. Determine if patient is in respiratory arrest.
2. Make a decision as to course of action.

STUDENT'S NAME______________________________DATE__________

EVALUATOR'S NAME____________________________COURSE_________

DIRECTIONS TO THE EVALUATOR:

> Use the following checklist to evaluate a student's performance when assessing the respiratory emergency.

PERFORMANCE DETERMINANTS	YES	NO
1. Surveyed area for possible personal or patient hazards.	________	________
2. Checked patient for pulse in at least two different areas.	________	________
3. Checked patient's pupil reaction.	________	________
4. Checked patient for signs of breathing.	________	________
5. Laid patient flat on back.	________	________
6. Called for help.	________	________
7. Made note of time and condition of patient.	________	________

CHECKLIST

DUTY Performing Patient Care Services

TASK Administer artificial ventilation to a patient.

ENABLER

1. Distinguish artificial ventilation procedures for an unconscious infant.

STUDENT'S NAME______________________________DATE__________

EVALUATOR'S NAME____________________________COURSE________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's performance when performing artificial ventilation on a child resuscitation model.

PERFORMANCE DETERMINANTS	YES	NO
1. Checked the oral airway for obstructions.		
2. Cleared the oral cavity using the proper technique.		
3. Positioned patient to receive artificial ventilation.		
4. Placed mouth over infant's nose and mouth.		
5. Blew shallow breaths into infant's nose and mouth.		
6. Removed mouth to allow exhalation.		
7. Repeated ventilations and exhalations at a rate of 20 shallow breaths per minute.		
8. Checked to see if patient was breathing on his/her own.		

PERFORMANCE DETERMINANTS (cont.)	**YES**	**NO**
9. Continued ventilation until patient was breathing on own or until help arrived.	_______	_______
10. Reported case information to physician and recorded information on patient's chart.	_______	_______

CHECKLIST

DUTY Performing Patient Care Services

TASK Administer artificial ventilation to a patient.

ENABLER

1. Distinguish artificial ventilation procedures for an adult.

STUDENT'S NAME________________________ **DATE**__________

EVALUATOR'S NAME________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when performing artificial ventilation on an adult resuscitation model.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Checked the oral airway for obstructions.		
2.	Cleared the oral cavity using the proper technique.		
3.	Lifted patient's neck upwards and tilted head backward until chin pointed almost straight upwards.		
4.	Sealed patient's nose with thumb and forefinger.		
5.	Took a deep breath prior to sealing mouth over patient's mouth.		
6.	Blew breath into patient's lungs.		
7.	Removed mouth and allowed patient's exhalation.		
8.	Repeated ventilations and exhalations at a rate of 12 breaths per minutes.		
9.	Checked to see if patient was breathing on own.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Continued ventilation until patient was breathing on own or help arrived.		
11. Reported case information to physician and recorded information on patient's chart.	______	______

PERFORMANCE OBJECTIVE NO. 67

TASK: Escort patient to and from waiting area, dressing room, examination room or treatment room.

STANDARD OF PERFORMANCE OF TASK:

The patient's identification must be verified and the patient must be escorted to a dressing room and instructed to remove necessary clothing and don a gown as required. Patients that are not ambulatory must be provided with wheelchair or stretcher and must be helped with removal of clothing. The patient must be taken to the examination/treatment room necessary to obtain the examination/treatment. The technologist must be courteous and helpful.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient
Gown
Wheelchair
Stretcher
Patient's chart
Physician's request

ENABLING OBJECTIVES:

1. Identify patient and verify examination/treatment.
2. Establish if patient is mobile.
3. Locate wheelchair or stretcher, if needed.
4. Review established department procedure for escorting patient from waiting room to examination/treatment room.

*RESOURCES:

1. Department policy/procedure manual.
2. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.

*RESOURCES: (cont.)

3. Keats, T., & Lusted, L. (1985). Atlas of roentgenographic measurements. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.
5. Wheelchair/stretcher.
6. Patient's chart.
7. Checklist - Escorting patient to and from waiting area.

TEACHING ACTIVITIES:

1. Explain and show students how to greet patients and escort them from waiting room. (* 1,2,3 & 4)
2. Explain to students how to instruct patient to remove clothing and don gown. (* 2,3 & 4)
3. Explain and demonstrate how to assist immobile patient with undressing and dressing. (* 2,3 & 4)
4. Show students how to assist patient to and from examination room. (* 2,3 & 4)
5. Explain and demonstrate how to instruct patient to remove radiopaque articles. (* 1)
6. Remind students to escort patient back to waiting area, patient account department or exit. (* 1 & 5)
7. Monitor students as they practice escorting patients to and from waiting area, dressing room, examination room or treatment room. (* 5 & 6)
8. Supervise and evaluate students escorting patients to and from waiting area, dressing room, examination room or treatment room. (* 7)

CRITERION-REFERENCED MEASURE:

The student must verify patient identification, escort patient to examination/treatment, assist patient if needed and assist the return of the patient to waiting area.

PERFORMANCE GUIDE:

1. Verify examination/treatment patient is to receive.
2. Identify and greet patient.
3. Direct patient from waiting area to dressing room.
   NOTE: If not ambulatory, the patient must be provided with a wheelchair or stretcher as condition dictates.
4. Instruct patient to remove clothing and don gown if necessary.

PERFORMANCE GUIDE: (cont.)

5. Assist patient to the examination/treatment room.
6. Assist patient from examination/treatment room to dressing room upon completion of examination/treatment.
7. Instruct patient to dress.
8. Assist patient back to waiting area, patient account department or exit.

CHECKLIST

DUTY Performing Patient Care Services

TASK Escort patient to and from waiting area, dressing room, examination room or treatment room.

ENABLER

1. Identify examination/treatment patient is to receive.
2. Establish if patient is mobile.
3. Locate wheelchair or stretcher if needed.

STUDENT'S NAME______________________________DATE__________

EVALUATOR'S NAME____________________________COURSE________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to escort a patient to and from waiting area, dressing room, examination room or treatment room.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Reviewed physician's request.	______	______
2.	Identified and greeted patient.	______	______
3.	Directed patient from waiting area to dressing room.	______	______
4.	Instructed patient to remove clothing and don gown if necessary.	______	______
5.	Assisted patient to the examination/treatment room providing wheelchair or stretcher as indicated..	______	______
6.	Assisted patient from examination/treatment room to dressing room upon completion of exam/treatment.	______	______
7.	Instructed patient to dress.	______	______
8.	Assisted patient back to waiting area, patient account department or exit.	______	______

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 68

TASK: Administer emergency care for patient having severe adverse reaction to radiographic contrast media, procedures, or accident.

STANDARD OF PERFORMANCE OF TASK:

Emergency care for patient during adverse reaction, will include the basic ABC (airway, breathing, cardiac) needs required to sustain and attempt to stabilize patient until assistance arrives. Incident report must be filed immediately, following department policies and procedures.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Patient situation
Department policy/procedures
Emergency drug tray/cart (when available)

ENABLING OBJECTIVES:

1. Recall signs of adverse reaction to contrast media.
2. Identify methods contrast media is administered.
3. Locate emergency drug cart/tray.
4. Review established department policy/procedure for administering emergency care for adverse reaction to contrast media.

*RESOURCES:

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). _Nuclear medicine technology and techniques_. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). _Principles and practices of nuclear medicine_. St. Louis, MO: C.V. Mosby Company.
4. Caroline, N. (1987). _Emergency medical treatment_. Boston, MA: Little, Brown and Company.

*RESOURCES: (cont.)

5. Eckert, C. (1981). Emergency-room care (4th ed.). Boston, MA: Little, Brown and Company.
6. Jenkins, J., & Loscalzo, J. (1986). Manual of emergency medicine. Boston, MA: Little, Brown and Company.
7. Patient's chart.
8. Incident report.
9. Emergency drug tray/cart.
10. Checklist - Administering emergency first aid for adverse reaction to contrast media.

TEACHING ACTIVITIES:

1. Conduct a class discussion on assessing the patient to determine the needs and existing symptoms of the patient. (* 1,2,3 & 4)
2. Review the department procedure for calling for assistance. (* 1)
3. Explain and show how to assess airway, breathing and cardiac status. (* 4,5 & 6)
4. Review and demonstrate how to ensure airway and institute cardiopulmonary resuscitation if needed. (* 4,5 & 6)
5. Show students how to stabilize the patient and make sure patient is as comfortable as possible. (* 2,3,4,5,6 & 9)
6. Review department procedure on filing incident report. (* 1 & 8)
7. Demonstrate how to complete incident report and record incident on patient's chart. (* 7 & 8)
8. Monitor students as they practice administering emergency care for patient having severe adverse reaction. (* 7,8 & 9)
9. Supervise and evaluate students administering emergency care for patient having severe adverse reaction. (* 10)

CRITERION-REFERENCED MEASURE:

The student must assess patient's symptom, call for assistance, assess breathing, stabilize patient, make patient comfortable, file incident report and record incident on patient's chart.

PERFORMANCE GUIDE:

1. Assess the patient to determine the needs and existing symptoms of the patient.
2. Assess the patient for outward signs of adverse reaction.

PERFORMANCE GUIDE: (cont.)

3. Notify/call for assistance per department policy.
4. Assess airway, breathing and cardiac status.
5. Ensure airway and if required institute cardiopulmonary resuscitation as needed.
6. Attempt to stabilize the patient until assistance arrives.
7. Make the patient as comfortable as possible.
8. File incident report according to department policies and procedure.
9. Record incident occurrence on patient's chart.

CHECKLIST

DUTY Performing Patient Care Services

TASK Administer emergency care for patient having severe adverse reaction to radiographic contrast media, procedures, or accident.

ENABLER

1. Recall signs of adverse reaction to contrast media.
2. Recall methods contrast media is administered.
3. Locate emergency drug cart/tray.

STUDENT'S NAME________________________________ DATE__________

EVALUATOR'S NAME_____________________________ COURSE________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to administer emergency care for patient having severe adverse reaction to radiographic contrast media, procedures, or accident.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Assessed the patient to determine the needs and existing symptoms of the patient.	________	________
2.	Assessed the patient for outward signs of adverse reaction.	________	________
3.	Notified/called for assistance per department policy.	________	________
4.	Assessed airway, breathing and cardiac status.	________	________
5.	Ensured airway and instituted cardiopulmonary resuscitation as needed.	________	________
6.	Attempted to stabilize the patient until assistance arrived.	________	________
7.	Made the patient as comfortable as possible.	________	________

PERFORMANCE DETERMINANTS (cont.)	YES	NO
8. Filed incident report according to department policies and procedures.	________	________
9. Recorded incident occurrence on patient's chart.	________	________

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 69

TASK: Apply lead contacts (spatula-type) internal eye shield.

STANDARD OF PERFORMANCE OF TASK:

The lead contacts must be inserted so as to protect the patient's eyes from radiation exposure. The lead contacts must be inserted without damage or discomfort to patient's eyes.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Lead contacts
Eye lubrication drops

ENABLING OBJECTIVES:

1. Locate lead contacts with patient identification on them.
2. Locate lubrication drops for contacts.
3. Recall patient positioning for applying lead contacts.
4. Review established department policy/procedure for applying lead contacts.

*RESOURCES:

1. Department policy/procedure manual.
2. Casciato, D., & Lowitz, B. (1987). Manual of bedside oncology (2nd ed.). Boston, MA: Little, Brown and Company.
3. Fischer, D., & Marsh, J. (1982). Cancer therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Howland, W., & Carlon, G. (1985). Management of the critically ill cancer patient. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Lokich, J. (1978). Primer of cancer management. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

*RESOURCES: (cont.)

6. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique and results (6th ed.). St. Louis, MO: C.V. Mosby Company.
7. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
8. Portlock, C., & Goffinet, D. (1986). Manual of clinical problem in oncology (2nd ed.). Boston, MA: Little, Brown and Company.
9. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
10. Lead contacts.
11. Eye lubrication drops.
12. Patient chart.
13. Checklist - Applying lead contacts.

TEACHING ACTIVITIES:

1. Explain and show student how to greet patient, verify patient's identification and explain procedure. (* 1 & 12)
2. Explain and show students how to position patient to insert internal eye shield. (* 2,5,6,7 & 8)
3. Identify steps and demonstrate how to insert internal eye shield. (* 2,3,4,9, 10 & 11)
4. Explain and show students how to position patient to remove internal eye shield. (* 2,3,4,6,7 & 8)
5. Identify steps and demonstrate how to remove internal eye shield. (* 2,3,4,9 & 10)
6. Monitor students as they practice inserting and removing internal eye shields. (* 10,11 & 12)
7. Supervise and evaluate students inserting and removing internal eye shields. (* 13)

CRITERION-REFERENCED MEASURE:

The student must verify physician's orders, verify patient's identification and explain procedure, verify lead contact identification, position patient, insert lubrication drops in patient's eyes, and insert or remove lead contacts.

PERFORMANCE GUIDE:

1. Verify physician's orders.
2. Greet patient, verify patient's identification and explain procedure.

PERFORMANCE GUIDE: (cont.)

3. Insert internal eye shield: A. Position patient in a supine position on the treatment table and instruct patient to remain motionless.
    B. Place lubrication drops in patient's eye if prescribed.
    C. Hold eye lids open with one hand while inserting eye shield with the other.
    CAUTION: It is essential that the patient understands that they must remain motionless while eye shields are being inserted to avoid possible damage to the eye.
    D. Repeat procedure for inserting shield in other eye.
4. Remove internal eye shield:
    A. Position patient in an upright sitting position with the head leaning forward.
    B. Cup one hand, with palm up under patient's eye, and open patient's eye lids with the other.
    C. Allow the internal eye shield to drop into palm of hand.
    D. Repeat procedure for other eye.

CHECKLIST

DUTY Performing Patient Care Services

TASK Apply lead contacts (spatula-type) internal eye shield.

ENABLER

1. Locate lead contacts with patient identification on them.
2. Locate lubrication drops for contacts.
3. Recall patient positioning for applying lead contacts.

STUDENT'S NAME______________________________DATE__________

EVALUATOR'S NAME______________________________COURSE________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to apply lead contacts (spatula-type) internal eye shields.

PERFORMANCE DETERMINANTS	YES	NO
1. Verified physician's orders.	______	______
2. Greeted patient, verified patient's identification and explain procedure.	______	______
3. Inserted internal eye shield:		
- Positioned patient in a supine position on the treatment table and instructed patient to remain motionless.	______	______
- Placed lubrication drops in patient's eye if prescribed.	______	______
- Held eye lids open with one hand while inserting eye shield with the other.	______	______
4. Removed internal eye shield:		
- Positioned patient in an upright sitting position with the head leaning forward.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
4. Removed internal eye shield: (cont.)		
- Cupped one hand, with palm up under patient's eye, and opened patient's eye lids with the other.	______	______
- Allowed the internal eye shield to drop into palm of hand.	______	______
- Repeated procedure for other eye.	______	______

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 70

TASK: Insert radiopaque probe into female patient's vagina to localize cervix.

STANDARD OF PERFORMANCE OF TASK:

Radiopaque probe must localize the patient's cervix according to physician's request for future radiation therapy treatment. Patient comfort and aseptic technique must be maintained. Probe insertion information must be recorded on patient's chart.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Gloves
Lubricant
Cotton swabs
Disinfectant
Patient's chart
Radiopaque probe
Physician's/oncologist's request
Examination table with stirrups

ENABLING OBJECTIVES:

1. Verify physician's request.
2. Locate radiopaque probe.
3. Review established department policy/procedure for inserting a radiopaque probe to localize female patient's cervix.

*RESOURCES:

1. Department policy/procedure manual.
2. Casciato, D., & Lowitz, B. (1987). _Manual of bedside oncology_ (2nd ed.). Boston, MA: Little, Brown and Company.
3. Moss, W., & Cox, J. (1987). _Radiation oncology: Rationale, technique and results_ (6th ed.). St. Louis, MO: C.V. Mosby Company.

*RESOURCES: (cont.)

4. Shepherd, J., & Monaghan, J. (1985). Clinical gynecological oncology. Boston, MA: Blackwell Scientific Publications Ltd.
5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
6. Sterile tray.
7. Radiopaque probe.
8. Examination table with stirrups.
9. Patient's chart.
10. Checklist - Inserting radiopaque probe.

TEACHING ACTIVITIES:

1. Explain and show student how to greet patient, verify identification and explain procedure. (* 1 & 9)
2. Explain and show students how to position patient on examination table with patient's legs in stirrups. (* 1,3,4 & 8)
3. Instruct and demonstrate how to clean vulva and perineal area with disinfectant. (* 1,2,4,5 & 6)
4. Show students how to apply lubricant to probe. (* 4,5,6 & 7)
5. Explain and show student how to insert probe into vagina (* 4 & 5)
6. Explain procedure used to notify physician when insertion and localization is complete. (* 1)
7. Show students how to record procedure on patient's chart. (* 1,4,5 & 9)
8. Monitor students as they practice inserting radiopaque probe into female patient's vagina to localize cervix. (* 6,7,8 & 9)
9. Supervise and evaluate students inserting radiopaque probe into female patient's vagina to localize cervix. (* 10)

CRITERION-REFERENCED MEASURE:

The student must verify physician's/oncologist's request, verify patient's identification and explain procedure, position patient on examination table in stirrups, cleanse vulva and perineal area with disinfectant, lubricate probe, insert and position probe, notify physician/oncologist, and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Greet patient, verify patient identification and explain procedure to the patient.
3. Assist patient onto examination table and position legs in stirrups so the patient's vagina is accessible.
4. Cleanse vulva and perineal area with cotton swabs saturated with disinfectant.
5. Apply lubricant to probe.
6. Insert probe into vagina as appropriate to level of obstruction or cervix.
7. Notify physician when insertion and localization is complete.
8. Record procedure on patient's chart.

CHECKLIST

DUTY Performing Patient Care Services

TASK Insert radiopaque probe into female patient's vagina to localize cervix.

ENABLER

1. Verify physician's request.
2. Locate radiopaque probe.

STUDENT'S NAME______________________________DATE__________

EVALUATOR'S NAME______________________________COURSE________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to insert radiopaque probe into female patient's vagina to localize cervix.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's/oncologist's request.		
2.	Greeted patient, verified patient identification and explained procedure to the patient.		
3.	Assisted patient onto examination table and positioned legs in stirrups so the patient's vagina is accessible.		
4.	Cleansed vulva and perineal area with cotton swabs saturated with disinfectant.		
5.	Applied lubricant to probe.		
6.	Inserted probe into vagina as appropriate to level of obstruction or cervix.		
7.	Notified physician when insertion and localization was complete.		
8.	Recorded procedure on patient's chart.		

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 71

TASK: Administer prescribed medication to patient orally.

STANDARD OF PERFORMANCE OF TASK:

The prescribed medication must be verified, administered and the patient observed until the medication is swallowed. Administered medication must be recorded on the patient's chart.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's orders
Patient's chart
Patient's identification bracelet
Prescribed medication

ENABLING OBJECTIVES:

1. Identify prescribed dosage of medicine.
2. Measure medication dosage.
3. Verify physician's orders and medication identification.
4. Review established department procedure for administering medication orally.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Salm, T., Cutler, B., & Wheeler H. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.
5. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.

*RESOURCES: (cont.)

6. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
7. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
8. Prescribe medication.
9. Patient's chart/medical record.
10. Checklist - Administering prescribed medication orally.

TEACHING ACTIVITIES:

1. Review methods to verify patient's identification and allergy history.(* 1 & 5)
2. Instruct and show students how to check label for correct medication and calculate correct dosage. (* 2,3,4 & 5)
3. Discuss the need to double check medication label and dosage calculation (* 1,5 & 7)
4. Identify and show students how to greet patient, explain procedure and determine if patient is on medication. (* 1,5 & 6)
5. Explain and demonstrate correct way to give medicine to patient. (* 5,6,7 & 8)
6. Review procedure for discarding medication container. (* 1,2 & 3)
7. Conduct class discussion on possible adverse reactions. (* 2,3,4,5,6 & 7)
8. Review department procedure and demonstrate how to record date, time and medication administered on patient's chart. (* 1 & 9)
9. Monitor students as they practice administering prescribed medication to patient orally. (* 8 & 9)
10. Supervise and evaluate students administering prescribed medication to patient orally. (* 10)

CRITERION-REFERENCED MEASURE:

The student must verify physician's order and medication identification and dosage, verify patient and explain procedure, observe patient swallow medicine, observe patient for adverse reaction and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Verify physician's orders, patient's identification and patient's allergy history.

PERFORMANCE GUIDE: (cont.)

2. Secure prescribed medication.
3. Check label for correct medication and calculate correct dosage.
   NOTE: Always double check medication label and dosage calculation.
4. Greet patient, explain procedure, and determine if patient is on medication.
5. Provide prescribed medication to patient and observe patient swallowing medication.
6. Discard medication container.
7. Observe patient for adverse reactions.
8. Record date, time, and medication administered on patient's chart.

CHECKLIST

DUTY Performing Patient Care Services

TASK Administer prescribed medication to patient orally.

ENABLER

1. Identify prescribed dosage of medicine.
2. Measure medication dosage.
3. Verify physician's orders and medication identification.

STUDENT'S NAME______________________________ DATE__________

EVALUATOR'S NAME______________________________ COURSE__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to administer prescribed medication to patient orally.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's orders and patient's identification.	_______	_______
2.	Secured prescribed medication.	_______	_______
3.	Checked label for correct medication and calculated correct dosage.	_______	_______
4.	Greeted patient, explained procedure, and determined if patient was on medication.	_______	_______
5.	Provided prescribed medication to patient and observed patient swallowing medication.	_______	_______
6.	Discarded medication container.	_______	_______
7.	Observed patient for adverse reactions.	_______	_______
8.	Recorded date, time, and medication administered on patient's chart.	_______	_______

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 72

TASK: Inform patient or family member about examination/treatment procedures.

STANDARD OF PERFORMANCE OF TASK:

Information/instruction must be given at a convenient time prior to the procedure. All questions asked by patient/family member must be answered promptly and accurately. The patient must understand the procedure that they are to receive and the steps/instructions that they are to follow.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Procedure informational brochure
Patient instruction sheet

ENABLING OBJECTIVES:

1. Identify procedure/treatment patient is receiving.
2. Recall procedure information to be given to patient's family.
3. Review established department policy/procedure for informing patient or family member about examination/treatment procedure.

*RESOURCES:

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
4. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
5. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.

*RESOURCES: (cont.)

6. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
7. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.
8. Patient chart.
9. Procedure informational brochure.
10. Patient instruction sheet.
11. Checklist - Providing information to patient/family.

TEACHING ACTIVITIES:

1. Review procedure for identifying patient and verifying examination/treatment patient is to receive. (* 1 & 8)
2. Discuss the importance of informing patient of procedure and making sure patient understands the information. (* 2,3 & 4)
3. Show students examples of informational brochures for examination/treatment. (* 9 & 10)
4. Demonstrate methods for explaining procedures for examination/treatment. (* 2,3,4,5 & 6)
5. Monitor students as they answer questions from patient regarding their treatment. (* 1)
6. Discuss the importance of relieving patient of any fears or questions he/she may have pertaining to his/her treatment/examination. (* 2,5,6 & 7)
7. Review procedure for rechecking patient's procedure information. (* 1 & 8)
8. Supervise and evaluate student's performance while informing patient/family about examination/treatment procedure. (* 11)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and examination/treatment to be received, provide patient with informational brochure, explain examination/treatment, review patient instructions and answer any patient questions.

1. Verify patient identification and examination/treatment patient is to receive.
2. Provide patient informational brochure and/or instructions for examination/treatment.

PERFORMANCE GUIDE: (cont.)

3. Explain examination/treatment purpose and procedure to patient.
4. Review patient instructions with patient until he/she understands them fully.
5. Answer promptly and accurately any questions the patient or family member has.

CHECKLIST

DUTY Performing Patient Care Services

TASK Inform patient or family member about examination/ treatment procedures.

ENABLER

1. Identify procedure/treatment patient is receiving.
2. Recall procedure information to be given to patient's family.

STUDENT'S NAME______________________________DATE__________

EVALUATOR'S NAME____________________________COURSE__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to inform patient or family member about examination/treatment procedures.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified patient identification and examination/treatment patient was to receive.	_______	_______
2.	Provided patient informational brochure and/or instructions for examination/ treatment.	_______	_______
3.	Explained examination/treatment purpose and procedure to patient.	_______	_______
4.	Reviewed patient instructions with patient until he/she understood them fully.	_______	_______
5.	Answered promptly and accurately any questions the patient or family member had.	_______	_______

DUTY: PERFORMING PATIENT CARE SERVICES

PERFORMANCE OBJECTIVE NO. 73

TASK: Inject patient intramuscularly.

STANDARD OF PERFORMANCE OF TASK:

Aseptic technique must be used and the injection must be given when aspirated syringe is clear of blood. Aseptic technique during puncture must be maintained and performed in accordance with department written procedure.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient
Syringe
Alcohol swab
Sterile gauze
Patient's chart
Physician's request
1" to 1-1/2" (22 gauge) needle

ENABLING OBJECTIVES:

1. Identify solution to be injected.
2. Draw dosage into syringe.
3. Recall aseptic technique.
4. Review established department policy for injecting patient intramuscularly.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
4. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.

*RESOURCES: (cont.)

5. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.
6. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
7. Sterile tray.
8. Syringe with dosage.
9. Patient's chart.
10. Checklist - Injecting patient intramuscularly.

TEACHING ACTIVITIES:

1. Review procedure for verifying patient's identification and checking physician's orders. (* 1 & 9)
2. Discuss importance of explaining procedure to patient. (* 1 & 2)
3. Explain how to verify dosage and prepare injection site. (* 3,4,5 & 6)
4. Demonstrate how to verify dosage and prepare injection site. (* 1 & 7)
5. Discuss method for cleansing puncture site with alcohol swab. (* 7)
6. Show how to cleanse puncture site with alcohol swab. (* 7)
7. Discuss the importance of allowing alcohol to dry to prevent alcohol burns. (* 1,3 & 4)
8. Explain why pinching the skin reduces pain of injection. (* 2,3,4,5 & 6)
9. Demonstrate how to pinch the skin and make the needle puncture. (* 1 & 8)
10. Discuss the fact that injecting medication intramuscularly could possibly be fatal.
11. Monitor students as they pull back on plunger to make sure needle is not in a vein and push medication into site. (* 8)
12. Show how to withdraw needle quickly. (* 8)
13. Discuss why and how to massage area after administering injection. (* 7 & 8)
14. Explain disposal of needle according to specific hospital procedures. (* 2,3,4,5 & 6)
15. Review procedure for recording patient's information on chart. (* 1 & 9)
16. Monitor students as they practice injecting a patient intramuscularly. (* 7 & 8)
17. Supervise and evaluate students while they inject a patient intramuscularly. (* 10)

CRITERION-REFERENCED MEASURE:

The student must verify patient identification and physician's request, explain procedure to patient, clean injection area with alcohol, pinch skin, make needle puncture, aspirate needle, inject fluid, withdraw needle, massage injection site with dry gauze, dispose of needle and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Verify patient's name.
2. Verify physician's request.
3. Explain procedure to patient.
4. Verify dosage and select injection site.
5. Clean area with alcohol swab.
6. Allow alcohol to dry thoroughly.
7. Pinch skin.
8. Make needle puncture rapidly to depth of 1" to 1-1/2" perpendicular to skin surface.
9. Aspirate needle to ensure that there is no blood return.
10. Inject fluid with slow steady pressure.
11. Withdraw needle rapidly.
12. Massage area with dry gauze square for 15 seconds to disperse fluid.
13. Dispose of needle in accordance with hospital procedures.
14. Record procedure on patient's chart.

CHECKLIST

DUTY Performing Patient Care Services

TASK Inject patient intramuscularly.

ENABLER

1. Identify solution to be injected.
2. Draw up dosage into syringe.
3. Recall aseptic technique.

STUDENT'S NAME________________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to inject patient intramuscularly.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified patient's name.		
2.	Verified physician's request.		
3.	Explained procedure to patient.		
4.	Verified dosage and selected injection site.		
5.	Cleaned area with alcohol swab.		
6.	Allowed alcohol to dry thoroughly.		
7.	Pinched skin.		
8.	Made needle puncture rapidly to depth of 1" to 1-1/2" perpendicular to skin surface.		
9.	Aspirated needle to ensure that there was no blood return.		
10.	Injected fluid with slow steady pressure.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
11. Withdrew needle rapidly.		
12. Massaged area with dry gauze square for 15 seconds to disperse fluid.		
13. Disposed of needle in accordance with hospital procedures.		
14. Recorded procedure on patient's chart.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 74

TASK: Set up procedure trays for special examinations.

STANDARD OF PERFORMANCE OF TASK:

Special exam trays must include predetermined components and be prepared using aseptic technique.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Assistant
Sterile towels
Sterile gloves
Medical supplies
Specific procedure tray
Special procedure manual

ENABLING OBJECTIVES:

1. Locate special procedure manual.
2. Identify type of special procedure that tray is being set up for.
3. Review established department procedure for setting up a procedure tray.

*RESOURCES:

1. Department policy/procedure manual.
2. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
3. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
4. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
5. Special procedure tray.
6. Special procedure manual.
7. Special procedure supplies and materials.
8. Checklist - Setting up procedure trays.

TEACHING ACTIVITIES:

1. Explain how to verify schedule to determine which special examination is to be performed. (* 1)
2. Review location of special procedures manual and tray. (* 1,5 & 6)
3. Show student how to get manual and tray. (* 5,6 & 7)
4. Review department procedures concerning sterile techniques. (* 1)
5. Explain and demonstrate how to check tray contents with checklist in manual. (* 2,3 & 4)
6. Review and demonstrate correct procedure for arranging supplies on tray in convenient sequence. (* 2,3 & 4)
7. Show students how to drape sterile towels over tray to maintain sterile conditions. (* 1)
8. Supervise students while they practice setting up procedure for trays for special examinations. (* 5,6 & 7)
9. Supervise and evaluate students setting up trays for special examinations. (* 8)

CRITERION-REFERENCED MEASURE:

The student must determine special procedure to be performed, locate manual and tray, verify tray contents, add additional supplies to tray, arrange supplies on tray in convenient manner, and drape tray to maintain sterility.

PERFORMANCE GUIDE:

1. Determine special examination to be performed.
2. Obtain special procedures manual and tray.
3. Open tray utilizing sterile technique.
4. Check tray contents against checklist in manual.
   NOTE: Additional supplies and contrast media must be secured by assistant.
5. Arrange supplies included in tray in convenient manner.
6. Cover tray with sterile towels to maintain sterility.

CHECKLIST

DUTY Performing Support Services

TASK Set up procedure trays for special examinations.

ENABLER

1. Locate special procedure manual.
2. Identify type of special procedure that tray is being set up for.

STUDENT'S NAME____________________________**DATE**__________

EVALUATOR'S NAME__________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to set up procedure trays for special examinations.

PERFORMANCE DETERMINANTS	YES	NO
1. Determined special examination to be performed.		
2. Obtained special procedures manual and tray.		
3. Opened tray utilizing sterile technique.		
4. Checked tray contents against checklist in manual.		
5. Arranged supplies included in tray in convenient manner.		
6. Covered tray with sterile towels to maintain sterility.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 75

TASK: Clean radiographic equipment and facilities.

STANDARD OF PERFORMANCE OF TASK:

The radiographic facilities and equipment must be cleaned and free of dust and foreign matter. All foreign matter must be disposed of according to hospital or state regulations and procedures.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Gloves
Alcohol
Plastic bags
Cleaning cloth
Germicidal solution
Radiographic room
Radiographic equipment
Contaminated waste container

ENABLING OBJECTIVES:

1. Identify radiographic equipment and facility to be cleaned.
2. List equipment to be cleaned.
3. Assemble cleaning supplies needed.
4. Review established department procedure for cleaning radiographic equipment and facilities.

***RESOURCES:**

1. Department policy/procedure manual.
2. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
3. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
4. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.

*RESOURCES: (cont.)

5. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
6. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
7. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
8. Radiologic equipment.
9. Cleaning materials and supplies.
10. Checklist - Cleaning radiographic equipment and facilities.

TEACHING ACTIVITIES:

1. Review procedure for discarding disposable items. (* 1,2,4,5 & 6)
2. Show students how to place wet items in waterproof bags, seal tightly and discard. (* 9)
3. Review cleaning materials and supplies and their location. (* 1)
4. Discuss danger of using wet cloths on electrical equipment.
5. Demonstrate dusting of machine with clean, damp cloth. (* 3,8 & 9)
6. Explain and demonstrate methods of disinfecting table beginning with the least dirty and ending with the most dirty. (* 1,4 & 5)
7. Discuss the danger of cleaning electrical conducting pieces of equipment. (* 1,3 & 7)
8. Demonstrate cleaning of electrical parts with clean dry cloth or alcohol on cloth. (* 8 & 9)
9. Identify correct procedure for disposal of contaminated needles and gloves in appropriate container. (* 1,4 & 5)
10. Show students how to dispose of contaminated needles and glove in appropriate waste container. (* 9)
11. Explain and demonstrate cleaning of cassettes with germicide. (* 4,5 & 9)
12. Review procedure for preparing table for next patient. (* 1,2,4 & 5)
13. Show students how to place fresh linens on table and pillow. (* 9)
14. Monitor students as they practice cleaning radiographic equipment and facilities. (* 8 & 9)
15. Supervise and evaluate students as they clean radiographic equipment and facilities. (* 10)

CRITERION-REFERENCED MEASURE:

The student must discard disposable items, clean and disinfect equipment and tools, disinfect examination table and place fresh linen on it.

PERFORMANCE GUIDE:

1. Place dampened or wet items such as dressings and bandages in waterproof bags and close bags tightly before discarding.
2. Dust mechanical parts of x-ray machine with clean, damp (not wet) cloth.
   NOTE: Ensure that x-ray machine is turned off prior to cleaning.
3. Clean table with disinfectant beginning with the least dirty to the most dirty area.
4. Clean overhead parts (x-ray tube and other parts that conduct electricity) with alcohol or a clean dry cloth.
5. Place contaminated needles and gloves in contaminated waste container.
6. Clean outside of cassettes with cloth dampened with germicidal solution.
7. Place fresh linen on table and pillow.
   NOTE: Always disinfect cleaning materials before reuse or dispose of them according to hospital procedures.

CHECKLIST

DUTY Performing Support Service

TASK Clean radiographic equipment and facilities.

ENABLER

1. Identify radiographic equipment and facility to be cleaned.
2. List equipment to be cleaned.
3. Assemble cleaning supplies needed.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to clean radiographic equipment and facilities.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Placed dampened or wet items such as dressings and bandages in waterproof bags and closed bags tightly before discarding.	_______	_______
2. Dusted mechanical parts of x-ray machine with clean, damp (not wet) cloth.	_______	_______
3. Cleaned table with disinfectant beginning with the least dirty to the most dirty area.	_______	_______
4. Cleaned overhead parts (x-ray tube and other parts that conduct electricity) with alcohol or a clean dry cloth.	_______	_______
5. Placed contaminated needles and gloves in contaminated waste container.	_______	_______
6. Cleaned outside of cassettes with cloth dampened with germicidal solution.	_______	_______
7. Placed fresh linen on table and pillow.	_______	_______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 76

TASK: Administer contrast media orally.

STANDARD OF PERFORMANCE OF TASK:

The patient must be positively identified. The contrast media must be positively identified and calculated. The contrast media must be administered and the patient observed until the contrast media is swallowed.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Contrast media
Physician's order
Dosage chart
Media container
Patient I.D. bracelet

ENABLING OBJECTIVES:

1. Identify type of contrast media to be administered.
2. Locate dosage chart.
3. Recall safety procedures for adverse reaction to contrast media.
4. Review established department policy/procedures for administering contrast media orally.

***RESOURCES:**

1. Department policy/procedure manual.
2. Salm, T., Cutler, B., & Wheeler H. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.
3. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
4. Armstrong, P., & Wastie, M. (1986). Diagnostic imaging. Boston, MA: Blackwell Scientific Publications Ltd.

*RESOURCES: (cont.)

5. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
6. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
7. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
8. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
9. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
10. Contrast media.
11. Patient's chart/medical history.
12. Checklist - Administering contrast media orally.

TEACHING ACTIVITIES:

1. Discuss proper procedure for determining patient's identity, allergy history, and physician's order. (* 1 & 11)
2. Review correct procedure for selection of contrast media for specified examination. (* 4,5,6,7,8 * 9)
3. Demonstrate selection of contrast media required for examination. (* 4,5,8,9 & 10)
4. Discuss and show students how to verify contrast media by reading the label. (* 1 & 10)
5. Explain and show students how to calculate correct dosage according to product specifications. (* 4,5,8,9 & 10)
6. Identify and demonstrate correct method of explaining the procedure to the patient. (* 1,3 & 6)
7. Explain and show students how to hand contrast media to patient and watch until patient swallows the contrast media. (* 10)
8. Demonstrate disposal of contrast media container. (* 10)
9. Discuss signs and symptoms of adverse reactions to contrast media. (* 2,4,5,7,8 & 9)
10. Demonstrate procedure for treating adverse reaction to contrast media. (* 2,4,6 & 8)
11. Identify and demonstrate department procedure for recording information on patient's chart. (* 1 & 12)

TEACHING ACTIVITIES: (cont.)

12. Monitor the students as they practice administering contrast media orally. (* 10)
13. Supervise and evaluate students administering contrast media orally. (* 12)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and medical history, verify physician's orders, select correct contrast media, calculate media dosage, explain procedure to patient, observe patient take media orally, monitor patient for signs of adverse reaction, and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Verify patient's identification, allergy history, and physician's orders.
2. Select proper contrast media from supply.
3. Check label for correct contrast media.
4. Calculate correct dosage.
5. Greet and identify patient.
6. Explain procedure to patient.
7. Hand contrast media to patient and observe patient swallowing contrast media.
8. Discard media container.
9. Observe patient for adverse reactions.
10. Record procedure on chart.

CHECKLIST

DUTY Performing Support Services

TASK Administer contrast media orally.

ENABLER

1. Identify type of contrast media to be administered.
2. Locate dosage chart.
3. Recall safety procedures for adverse reaction to contrast media.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to administer contrast media orally.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified patient's identification, allergy history, and physician's orders.	______	______
2.	Selected proper contrast media from supply.	______	______
3.	Checked label for correct contrast media.	______	______
4.	Calculated correct dosage.	______	______
5.	Greeted and identified patient.	______	______
6.	Explained procedure to patient.	______	______
7.	Handed contrast media to patient and observed patient swallowing contrast media.	______	______
8.	Discarded media container.	______	______
9.	Observed patient for adverse reactions.	______	______
10.	Recorded procedure on chart.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 77

TASK: Administer contrast media rectally.

STANDARD OF PERFORMANCE OF TASK:

The contrast media must be warmed to 97 degrees - 100 degrees Fahrenheit and placed in patient's rectum via an enema bag and tube. Patient comfort must be maintained.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's orders
Contrast media
Hanger pole
Enema bag and lubricant tube

ENABLING OBJECTIVES:

1. Identify type of contrast media to be used.
2. Assemble equipment and supplies.
3. Verify physician's orders.
4. Review established department policy/procedure for administering contrast media rectally.

***RESOURCES:**

1. Department policy/procedure manual.
2. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
5. Casciato, D., & Lowitz, B. (1987). Manual of bedside oncology (2nd ed.). Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

6. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
7. Enema equipment.
8. Contrast media.
9. Patient's chart.
10. Checklist - Administering contrast media rectally.

TEACHING ACTIVITIES:

1. Conduct class discussion on equipment and supplies needed. (* 1 & 7)
2. Explain and show students how to greet patient and explain procedure to the patient. (* 1)
3. Review and demonstrate how to wash hands and don examination gloves. (* 1,2 & 6)
4. Discuss and demonstrate how to prepare solution according to radiologist's orders. (* 1,2,5 & 6)
5. Explain and demonstrate how to change bag and expel air from tubing. (* 2,3,4,5,6 & 7)
6. Instruct and show students how to position patient in Sims' position. (* 2 & 3)
7. Instruct and demonstrate how to insert lubricated enema tip slowly and gently. (* 2,3 & 4)
8. Explain and show students how to open clamp and regulate the flow according to radiologist's orders. (* 2,3,4 & 6)
9. Review procedure to obtain radiographers. (* 1,2 & 3)
10. Explain and show students how to assist patient on bedpan or to bathroom. (* 4 & 5)
11. Review department procedures concerning removal and cleaning or disposal of equipment. (* 1)
12. Review procedure for washing hands. (* 2 & 4)
13. Review and show students how to record procedure on patient's chart. (* 1 & 9)
14. Monitor students as they practice administering contrast media rectally. (* 7,8 & 9)
15. Supervise and evaluate students administering contrast media rectally. (* 10)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, prepare contrast solution, hang enema bag, position patient, insert rectal tip, regulate contrast flow, obtain radiographs, assist patient with bedpan or to bathroom, clean equipment, and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Check physician's orders.
2. Assemble equipment and supplies.
3. Identify patient and explain procedure.
4. Wash hands and don gloves.
5. Prepare solution:
   A. Obtain a pre-packaged enema bag filled with premeasured powdered barium.
   B. Check procedure manual and radiologist's orders to see if anything is to be added to the enema.
   C. Open the enema bag and fill it with warm water (97 degrees - 100 degrees Fahrenheit) to the mark indicated on the package (usually 1000 ml.).
   D. Add any additional preparations as indicated.
   E. Close the bag and shake vigorously.
6. Hang bag about 18" - 24" above patient.
7. Expel the air from tubing.
8. Position patient in Sims' position.
9. Lubricate tip of enema tube.
10. Insert rectal tube slowly and gently.
11. Regulate flow according to physician's instruction.
12. Obtain any radiographs the radiologist requests.
13. Assist patient on bedpan or to bathroom.
14. Remove and clean or dispose of equipment.
15. Wash hands.
16. Record procedure on patient's chart.

CHECKLIST

DUTY Performing Support Services

TASK Administer contrast media rectally.

ENABLER

1. Identify type of contrast media to be used.
2. Assemble equipment and supplies.
3. Verify physician's orders.

STUDENT'S NAME______________________ **DATE**__________

EVALUATOR'S NAME______________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to administer contrast media rectally.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Checked physician's orders.		
2.	Assembled equipment and supplies.		
3.	Identified patient and explain procedure.		
4.	Washed hands and donned gloves.		
5.	Prepared solution.		
6.	Obtained a pre-packaged enema bag filled with premeasured powdered barium.		
7.	Checked procedure manual and radiologist's orders to see if anything is to be added to the enema.		
8.	Opened the enema bag and filled it with warm water (97 degrees - 100 degrees F) to the mark indicated on the package (usually 1000 ml.).		
9.	Added any additional preparations as indicated.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Closed the bag and shook vigorously.	________	________
11. Hung bag about 18" - 24" above patient.	________	________
12. Expelled the air from tubing.	________	________
13. Positioned patient in Sims' position.	________	________
14. Lubricated tip of enema tube.	________	________
15. Inserted rectal tube slowly and gently.	________	________
16. Regulated flow according to physician's instruction.	________	________
17. Obtained any radiographs the radiologist requested.	________	________
18. Assisted patient on bedpan or to bathroom.	________	________
19. Removed and cleaned or disposed of equipment.	________	________
20. Washed hands.	________	________
21. Recorded procedure on patient's chart.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 78

TASK: Administer contrast through urinary catheters.

STANDARD OF PERFORMANCE OF TASK:

The selected contrast media will be administered via the urinary catheter using aseptic technique and proper flow rate, not to exceed the patient's bladder capacity.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient
IV pole
Procedure
Contrast media
Patient's chart
Consent form
Clamp/hemostat
Antiseptic and infusion set

ENABLING OBJECTIVES:

1. List types of contrast media.
2. Identify type of contrast media to be used.
3. Assemble infusion set and IV pole.
4. Recall signs of adverse reactions to contrast media.
5. Review established department policy/procedure for administering contrast media through a urinary catheter.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
5. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
6. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
7. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
8. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
9. Infusion set and IV pole.
10. Contrast media.
11. Set up urinary catheter.
12. Patient chart and consent form.
13. Checklist - Administering contrast media through a urinary catheter.

TEACHING ACTIVITIES:

1. Review department procedures for verifying patient identification & procedure request. (* 1)
2. Demonstrate how to establish rapport with patient. Explain procedure to the patient and obtain patient signature on consent forms. (* 1,2 & 11)
3. Explain and show students how to don sterile gloves and set up infusion set. (* 3,4,7,8 & 9)
4. Discuss how to verify correct contrast media type and date of expiration. (* 1,3,5 & 6)
5. Demonstrate how to check contrast media bottle for correct contrast media expiration date. (* 10)
6. Review proper procedures to prepare drip infusion set up. (* 3,4,7,8 & 9)
7. Demonstrate how to place contrast media bottle on IV pole, allow media to flow through the IV tubing, and connect infusion tip into urinary catheter. (* 3,4,9,10 & 11)
8. Show students how to hang contrast media above the patient's head.
9. Review how to determine correct infusion rate, (* 1,3,4,7 & 8)

TEACHING ACTIVITIES: (cont.)

10. Show students how to open clamp and allow bladder to fill totally with contrast media until patient becomes uncomfortable or contents have been infused. (* 9,10 & 11)
11. Discuss possible adverse reactions associated with contrast media. (* 2,3,4,5,6,7 & 8)
12. Demonstrate how to check patient for adverse reactions.
13. Show students how to clamp off tubing to restrict loss of contrast media. (* 9,10 & 11)
14. Conduct class discussion on procedures which utilizes contrast media administered through urinary catheters. (* 3,7 & 8)
15. Discuss procedure for removing tubing and voiding of contrast media. (* 3,7 & 8)
16. Demonstrate removal of infusion tubing and removal of clamp to allow patient to void. (* 9 & 11)
17. Identify correct disposal procedures. (* 3,4,5 & 6)
18. Show students how to discard disposable items. (* 9)
19. Review and demonstrate procedure used to release patient after procedure is complete. (* 1)
20. Discuss procedure for accurately recording examination procedure on patient's chart. (* 1 & 12)
21. Show students how to record accurate notations on patient's chart. (* 12)
22. Assign students to practice administering contrast through urinary catheters. (* 9,10 & 11)
23. Supervise and evaluate students administering contrast through urinary catheters. (* 13)

CRITERION-REFERENCED MEASURE:

The student must get patient's signature on consent form, setup infusion set, verify media type and expiration date, connect infusion set to urinary catheter, fill patient's bladder with contrast media, clamp infusion set, notify physician or perform radiographic procedure, observe patient for signs of adverse reaction, disconnect infusion tubing and collect contrast media, discard disposable items, and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Verify procedure request, patient identification, and explain the procedure to the patient.
2. Obtain patient signature on consent form.
3. Don sterile gloves and set up infusion set.
4. Check contrast media expiration date and that the proper media is on hand.
5. Set up IV pole and using aseptic technique clear IV tubing of air by allowing contrast to flow through the tubing to the tip.
6. Insert infusion tip into urinary catheter, secure tubing to patient.
7. Hang contrast media above patient's head.
8. Open the clamp until prescribed infusion rate is reached.
9. Observe rate and monitor patient for adverse reactions, or fluid leaking from the junction.
10. Administer until patient discomfort is reached or the contents have been infused.
11. Restrict loss of contrast by placing the hemostat or clamp between the junction of the infusion set and the patient.
12. Remove the infusion tubing and in a prescribed collecting system, remove the clamp/hemostat and allow the discharge of the contrast media from the bladder.
13. Discard disposable items and release patient when procedure complete.
14. Record procedure on patient's chart.

CHECKLIST

DUTY Performing Support Services

TASK Administer contrast through urinary catheters.

ENABLER

1. Identify type of contrast media to be used.
2. Assemble infusion set and IV pole.
3. Recall signs of adverse reactions to contrast media.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to administer contrast through urinary catheters.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified procedure request, patient identification, and explained the procedure to the patient.	______	______
2.	Obtained patient's signature on consent form.	______	______
3.	Donned sterile gloves and set up infusion set.	______	______
4.	Checked contrast media expiration date and that the proper media was on hand.	______	______
5.	Set up IV pole and using aseptic technique cleared IV tubing of air by allowing contrast to flow through the tubing to the tip.	______	______
6.	Inserted infusion tip into urinary catheter, secured tubing to patient.	______	______
7.	Hung contrast media above level of patient's head.	______	______

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
8.	Opened the clamp until prescribed infusion rate was reached.	________	________
9.	Observed rate and monitored patient for adverse reactions, or fluid leaking from the junction.	________	________
10.	Administered until patient discomfort was reached or the contents had been infused.	________	________
11.	Restricted loss of contrast by placing the hemostat or clamp between the junction of the infusion set and the patient.	________	________
12.	Removed the infusion tubing and in a prescribed collecting system, removed the clamp/hemostat and allowed the discharge of the contrast media from the bladder.	________	________
13.	Discarded disposable items, released patient when procedure complete.	________	________
14.	Recorded procedure on patient's chart.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 79

TASK: Administer contrast media intravenously.

STANDARD OF PERFORMANCE OF TASK:

Contrast media must be identified and the dosage calculated. Contrast media identity must be double checked before administering. Contrast media must be injected into intravenous additive port using sterile technique. Patient must be monitored for adverse reaction to contrast media.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Contrast media
Syringe
Physician's orders
Procedure tray

ENABLING OBJECTIVES:

1. Verify physician's orders for intravenous contrast media.
2. Locate contrast media and verify label.
3. Verify contrast media dosage.
4. Review patient chart for allergies.
5. Review established department procedure for administering contrast media intravenously.

***RESOURCES:**

1. Department policy/procedure manual.
2. Plumer, A. (1987). Principles and practice of intravenous therapy (4th ed.). Boston, MA: Little, Brown and Company.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.

RESOURCES: (cont.)

5. Goldberg, H., Higgins, C., & Ring, E. (1985). Contemporary imaging: Magnetic resonance imaging, computed tomography, and interventional radiology. St. Louis, MO: C.V. Mosby Company.
6. Moss, A., Rin, E., & Higgins, C. (1986). NMR, CT and interventional radiology. St. Louis, MO: C.V. Mosby Company.
7. Ring, E., & McLean, G. (1987). Interventional radiology: Principles and techniques. Boston, MA: Little, Brown and Company.
8. Rose, J. (1983). Invasive radiology: Risks and patient care. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
9. Wilkins, R., & Viamonte, M. (1982). Interventional radiology. Boston, MA: Blackwell Scientific Publications Ltd.
10. Procedure tray with syringe.
11. Contrast media.
12. Patient chart.
13. Set intravenous delivery system.
14. Checklist - Administering contrast media intravenously.

TEACHING ACTIVITIES:

1. Explain and show students how to verify patient identification and allergies, and explain procedure to patient. (* 1,2,4 & 12)
2. Review and demonstrate how to wash hands and put on examination gloves if available. (* 1,4 & 10)
3. Instruct and demonstrate how to assemble procedure tray using sterile technique. (* 1,4 & 10)
4. Explain and show students how to select contrast media based on radiographic procedure and physician's order. (* 7,8 & 9)
5. Instruct and demonstrate how to calculate correct dosage based on patient's weight. (* 2,3,4 & 5)
6. Explain and demonstrate how to prepare syringe using sterile technique. (* 2,4,6,10 & 11)
7. Discuss the need to expel air bubbles from syringe.
8. Review department policy concerning storage or disposal of medial container. (* 1 & 11)
9. Instruct and demonstrate how to cleanse intravenous additive port using sterile technique. (* 4 & 13)
10. Conduct class discussion on possible adverse reactions to contrast media. (* 2,3,4,5 & 6)
11. Review and demonstrate how to make accurate notations on patient's chart. (* 1 & 12)

TEACHING ACTIVITIES: (cont.)

12. Monitor students as they practice administering contrast media intravenously. (* 10,11,12 & 13)
13. Supervise and evaluate students administering contrast media intravenously. (* 14)

CRITERION-REFERENCED MEASURE:

The student must assemble procedure tray, verify patient identification and explain procedure, verify contrast media selected, calculate correct dose, prepare syringe with contrast media, cleanse additive port with alcohol swab, inject contrast media through additive port, monitor patient for adverse reactions, and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Check physician's orders for radiographic procedure to be done and patient allergies.
2. Verify patient's identity and explain procedure.
   CAUTION: Double check allergies by checking for allergy alert and asking patient to state allergies.
3. Wash hands.
4. Assemble procedure tray using sterile technique.
5. Select contrast media based on radiographic procedure and physician's orders.
   CAUTION: Check container label for correct contrast media.
6. Calculate correct dosage based on patient's weight.
7. Prepare syringe using sterile technique:
   A. Draw up proper dosage into syringe.
   B. Expel air from syringe.
8. Return media container to storage or discard, as appropriate.
   CAUTION: Check container label for correct contrast media before discarding or returning to storage.
9. Cleanse intravenous additive port with alcohol swab.
10. Inject contrast media through additive port.
11. Monitor patient for adverse reaction to contrast media.
12. Record procedure on patient's chart.

CHECKLIST

DUTY Performing Support Services

TASK Administer contrast media intravenously.

ENABLER

1. Verify physician's orders for intravenous contrast media.
2. Locate contrast media and verify label.
3. Verify contrast media dosage.
4. Review established department procedure for administering contrast media intravenously.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to administer contrast media intravenously.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Checked physician's orders for radiographic procedure to be done and patient allergies.		
2.	Verified patient's identity and explained procedure.		
3.	Washed hands.		
4.	Assembled procedure tray using sterile technique.		
5.	Selected contrast media based on radiographic procedure and physician's orders.		
6.	Calculated correct dosage based on patient's weight.		
7.	Prepared syringe using sterile technique.		
8.	Drew up proper dosage into syringe.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
9.	Expelled air from syringe.	________	________
10.	Returned media container to storage or discard, as appropriate.	________	________
11.	Cleansed intravenous additive port with alcohol swab.	________	________
12.	Injected contrast media through additive port.	________	________
13.	Monitored patient for adverse reaction to contrast media.	________	________
14.	Recorded procedure on patient's chart.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 80

TASK: Don sterile gowns, masks, and gloves.

STANDARD OF PERFORMANCE OF TASK:

Sterile garments must be donned and removed without contamination to patient, technologist or work area. Contaminated garments must be placed in an isolation hamper.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Practical Nurse Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Sterile mask
Sterile gloves
Isolation hamper
Soap and water
Sterile gown

ENABLING OBJECTIVES:

1. Assemble sterile garments.
2. Locate isolation hamper.
3. Review established department procedure for donning sterile garments.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
5. Sterile garments.
6. Isolation hamper.
7. Checklist - Donning sterile garments.

TEACHING ACTIVITIES:

1. Explain how to don sterile gown, mask, and gloves. (* 2,3 & 4)
2. Demonstrate how to don sterile gown, mask, and gloves. (* 5)
3. Stress importance of removing jewelry before donning gown, mask, and gloves. (* 1 & 4)
4. Discuss the importance of cleanliness before donning sterile gown, mask, and gloves. (*1,2 & 3)
5. Review procedure for removing gown, mask, and gloves. (* 2,3 & 4)
6. Demonstrate how to remove gown, mask, and gloves. (* 4)
7. Discuss importance of cleaning hands after removing gown, mask, and gloves as much as before they are put on. (* 2,3 & 4)
8. Explain and demonstrate what to do with soiled garments.
9. Monitor students as they don and remove sterile garments. (* 7)

CRITERION-REFERENCED MEASURE:

The student must remove jewelry, wash hands and arms, and don or remove sterile garments.

PERFORMANCE GUIDE:

1. Don gown, mask, and gloves:
    A. Remove watch and rings.
    B. Wash hands.
    C. Remove mask from container; place over nose and mouth and tie securely, top strings first.
    D. Hold gown at neck and let unfold.
    E. Put arms through sleeves, one at a time, touching only inside of gown.
    F. Adjust gown.
    G. Tie neck tapes.
    H. Bring gown together and tie waist belt.
    I. Obtain glove wrapper; lay on flat surface and unfold.
    J. Remove powder and powder hands if appropriate.
    K. Remove one glove from holder by grasping folded edge and place on hand. Repeat for second glove.

PERFORMANCE GUIDE: (cont.)

- L. Adjust gloves over gown and on fingers.

2. Remove gown, mask and gloves:
   - A. Untie waist belt of gown and pull toward front.
   - B. Untie neck ties.
   - C. Remove mask by untying bottom strings first.
   - D. Pull sleeves off one at a time without touching outside of gown.
   - E. Remove gown, fold gown with contaminated side in and dispose of gown in isolation hamper.
   - F. Remove one glove at a time. (Do not touch skin with dirty surface).
   - G. Dispose of gloves in isolation hamper.
   - H. Wash hands before and after leaving unit.

CHECKLIST

DUTY Performing Support Services

TASK Don sterile gowns, masks, and gloves.

ENABLER

1. Assemble sterile garments.
2. Locate isolation hamper.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to don sterile gowns, masks, and gloves.

PERFORMANCE DETERMINANTS	YES	NO
1. Donned gown, mask, and gloves:		
- Removed watch and rings.	______	______
- Washed hands.	______	______
- Removed mask from container; placed over nose and mouth and tied securely, top strings first.	______	______
- Held gown at neck and let unfold.	______	______
- Put arms through sleeves, one at a time, touching only inside of gown.	______	______
- Adjusted gown.	______	______
- Tied neck tapes.	______	______
- Brought gown together and tied waist belt.	______	______
- Obtained glove wrapper; laid on flat surface and unfold.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
- Removed powder and powdered hands if appropriate.		
- Removed one glove from holder by grasping folded edge and placed on hand. Repeat for second glove.		
- Adjusted gloves over gown and on fingers.		
2. Removed gown, mask and gloves:		
- Untied waist belt of gown and pulled toward front.		
- Untied neck ties.		
- Removed mask by untying bottom strings first.		
- Pulled sleeves off one at a time without touching outside of gown.		
- Removed gown, folded gown with contaminated side in and disposed of gown in isolation hamper.		
- Removed one glove at a time. (Do not touch skin with dirty surface).		
- Disposed of gloves in isolation hamper.		
- Washed hands before and after leaving unit.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 81

TASK: Wash hands and arms aseptically.

STANDARD OF PERFORMANCE OF TASK:

Hands, wrists, forearms, and fingernails must be clean, dry, and free of pathogenic microorganisms.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Lotion
Sink
Towel
Water
Scrub brush
Soap or cleansing agent

ENABLING OBJECTIVES:

1. Locate aseptic washing area.
2. Recall materials needed to wash aseptically.
3. Review established department procedure for washing hands and arms aseptically.

***RESOURCES:**

1. Department policy/procedure manual.
2. Klippel, A., & Anderson, C. (1979). Manual of emergency and outpatient techniques. Boston, MA: Little, Brown and Company.
3. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
4. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

5. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.
6. Cleaning materials.
7. Sink.
8. Checklist - Washing hands and arms aseptically.

TEACHING ACTIVITIES:

1. Conduct class discussion on the need to wash hands and arms aseptically. (* 1)
2. Show students how to turn on water and adjust water temperature to warm. (* 2 & 7)
3. Demonstrate how to wet hands thoroughly, holding hands downward in water. (* 2 & 7)
4. Demonstrate how to apply soap or cleansing agent. (* 1,2 & 6)
5. Identify procedure and show students how to wash hands and arms using friction for approximately 30 seconds, to wash palms and backs of hands, to wash fingers in rotary motions, and to wash wrists and forearms. (* 2,3,4 & 5)
6. Show students how to rinse hands and arms. (* 7)
7. Discuss the need for repeating washing and rinsing of hands and arms. (* 5)
8. Explain and demonstrate cleaning fingernails using scrub brush. (* 4,5 & 7)
9. Explain and demonstrate how to turn water off using foot of knee pedal or paper towel. (* 2,4,5 & 7)
10. Show students how to dry hands aseptically. (* 4 & 5)
11. Identify lotion and show students how to apply lotion. (* 4 & 5)
12. Monitor students as they practice washing hands and arms aseptically. (* 6 & 7)
13. Supervise and evaluate students washing hands and arms aseptically. (* 8)

CRITERION-REFERENCED MEASURE:

The student must adjust water, apply cleansing agent to hands, wrists and forearms, scrub hands, wrists and arms, rinse well, clean fingernails with scrub brush, turn off water using knee or foot pedal, dry well and apply lotion.

PERFORMANCE GUIDE:

1. Turn on water and adjust water temperature to warm.
2. Wet hands thoroughly with water, holding hands downward.
3. Apply soap or cleansing agent.
4. Wash hands and arms, using friction for approximately 30 seconds:
   - A. Wash palms and backs of hands.
   - B. Wash fingers in rotary motions.
   - C. Wash wrists and forearms.
5. Rinse arms and hands well.
6. Repeat steps 4-7.
7. Clean fingernails using scrub brush.
8. Rinse hands again.
9. Turn water off, using foot or knee pedal or paper towel.
10. Dry hands well.
11. Apply lotion.

CHECKLIST

DUTY Performing Support Services

TASK Wash hands and arms aseptically.

ENABLER

1. Locate aseptic washing area.
2. Recall materials needed to wash aseptically.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to wash hands and arms aseptically.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Turned on water and adjusted water temperature to warm.	_______	_______
2. Wet hands thoroughly with water, holding hands downward.	_______	_______
3. Applied soap or cleansing agent.	_______	_______
4. Washed hands and arms, using friction for approximately 30 seconds:		
- Washed palms and backs of hands.	_______	_______
- Washed fingers in rotary motions.	_______	_______
- Washed wrists and forearms.	_______	_______
5. Rinsed arms and hands well.	_______	_______
6. Repeat steps 4-7.	_______	_______
7. Cleaned fingernails using scrub brush.	_______	_______
8. Rinsed hands again.	_______	_______

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
9.	Turned water off, using foot or knee pedal or paper towel.	______	______
10.	Dried hands well.	______	______
11.	Applied lotion.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 82

TASK: Prepare video tape of screen display.

STANDARD OF PERFORMANCE OF TASK:

The video tape record must provide a clear, accurate image of the screen display.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Video tape record
Video cassette tape

ENABLING OBJECTIVES:

1. Identify video tape recorder to be used.
2. Recall type of video tape needed.
3. Identify type of screen display.
4. Review established department procedure for preparing video tape of screen display.

***RESOURCES:**

1. Department policy/procedure manual.
2. Wick, J. (1983). Fundamentals of ultrasound techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Athey, P., & McClendon, L. (1984). Diagnostic ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
6. Video tape recorder.
7. Video cassette tape.
8. Video tape recorder operation manual.
9. Screen display.
10. Checklist - Preparing video tape of screen display.

TEACHING ACTIVITIES:

1. Explain to students how to adjust screen display to obtain optimum image. (* 2,3,4 & 5)
2. Demonstrate how to adjust brightness, contrast, and sharpness to obtain optimum image. (* 9)
3. Review procedure for placing video cassette in recorder, turning on recorder and recording. (* 1 & 8)
4. Show students how to insert cassette, turn on recorder and press play/record buttons. (* 7 & 8)
5. Demonstrate procedure for recording enough frames for adequate record. (* 1,7 & 8)
6. Explain to students how to verify quality of recorded frames. (* 2,4 & 5)
7. Demonstrate how to adjust the tracking control if needed. (* 6,8 & 9)
8. Demonstrate how to remove video cassette. (* 6,7 & 8)
9. Identify storage procedure and demonstrate placing video cassette in storage. (* 1 & 6)
10. Explain and show students how to record exam data information according to department policy/ procedures. (* 1 & 6)
11. Monitor students as they practice preparing and recording video tape of screen display. (* 6,7,8 & 9)
12. Supervise and evaluate students preparing and recording videotape of screen display. (* 10)

CRITERION-REFERENCED MEASURE:

The student must adjust screen display, place tape in video recorder, record screen display on tape, remove video tape, label tape with examination information and store tape for future examination.

PERFORMANCE GUIDE:

1. Adjust screen display to obtain optimum image:
   A. Brightness.
   B. Contrast.
   C. Sharpness.

PERFORMANCE GUIDE: (cont.)

2. Place video cassette in recorder.
3. Turn on recorder and press play/record buttons.
4. Record enough frames for adequate record.
5. Verify quality of recorded frames.
6. Remove video cassette and place in storage.
7. Record exam data information per department policy/procedures.

CHECKLIST

DUTY Performing Support Services

TASK Prepare video tape of screen display.

ENABLER

1. Identify video tape recorder to be used.
2. Recall type of video tape needed.
3. Recall type of screen display.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare video tape of screen display

PERFORMANCE DETERMINANTS	YES	NO
1. Adjusted screen display to obtain optimum image:		
- Brightness.	_____	_____
- Contrast.	_____	_____
- Sharpness.	_____	_____
2. Placed video cassette in recorder.	_____	_____
3. Turned recorder and pressed play/record buttons.	_____	_____
4. Recorded enough frames for adequate record.	_____	_____
5. Verified quality of recorded frames.	_____	_____
6. Removed video cassette and placed in storage.	_____	_____
7. Recorded exam data information per department policy/procedures.	_____	_____

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 83

TASK: Prepare specimens for transfer.

STANDARD OF PERFORMANCE OF TASK:

The specimen must be labeled as to type and patient identification. A request for analysis must accompany the specimen to positively identify it with the patient. The specimen must be transferred in an approved container to prevent degradation and or loss of sample.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Labels
Request form
Specimen container
Patient identification

ENABLING OBJECTIVES:

1. Identify specimen to be transferred.
2. Establish specimen destination.
3. Review established department protocol for transferring specimens.

***RESOURCES:**

1. Department policy/procedure manual.
2. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
3. Thompson, T. (1980). Primer of clinical radiology. Boston, MA: Little, Brown and Company.
4. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
5. Gill, F., & Ashton, I. (1982). Monitoring for health hazards at work. Boston, MA: Blackwell Scientific Publications Ltd.
6. Specimen container labels.
7. Specimen containers.

***RESOURCES: (cont.)**

8. Analysis request form.
9. Checklist - Preparing specimens for transfer.

TEACHING ACTIVITIES:

1. Review information required on the specimen label. (* 1 & 6)
2. Discuss how specimen label information can be obtained.
3. Show how to fill out specimen labels. (* 6)
4. Review aseptic methods for obtaining a specimen. (* 1,2,3 & 4)
5. Demonstrate methods for collecting specimen in specimen container and sealing. (* 2,3 & 4)
6. Conduct class discussion stressing the importance of using aseptic methods to prevent specimen or personnel contamination. (* 5)
7. Discuss methods for securing label to container. (* 1,2,3 & 4)
8. Demonstrate procedure for attaching specimen label to the specimen container. (* 6 & 7)
9. Explain how to complete an analysis request form. (* 1,2,3 & 8)
10. Show the methods of attaching the analysis request form to the specimen container. (* 7 & 8)
11. Review the personnel or locations that a specimen might be forwarded to. (* 1)
12. Monitor student's practicing preparing specimens for transfer. (* 6,7 & 8)
13. Assign students to prepare a specimen for transfer. (* 9)

CRITERION-REFERENCED MEASURE:

The student must identify the specimen, fill out a specimen label, complete an analysis request form, attach the label and request form, attach the label and request form to the specimen container and forward specimen to appropriate personnel or location.

PERFORMANCE GUIDE:

1. Prepare patient specimen labels including patient's name, identification number, date, time, and specimen type.
2. Collect the specimen using aseptic technique to prevent contamination to yourself or the specimen.
3. Seal the collection container.

PERFORMANCE GUIDE: (cont.)

4. Adhere the label to the container and ensure the security.
5. Attach the request for analysis to the specimen container by use of tapes or a rubber band.
6. Forward the specimen to the necessary personnel for analysis.

CHECKLIST

DUTY Performing Support Services

TASK Prepare specimens for transfer.

ENABLER

1. Identify specimen to be transferred.
2. Establish specimen destination.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare specimens for transfer.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Prepared patient specimen labels including patient's name, identification number, date, time, and specimen type.	______	______
2. Collected the specimen using aseptic technique to prevent contamination to yourself or the specimen.	______	______
3. Sealed the collection container.	______	______
4. Adhered the label on the container and ensured the security.	______	______
5. Attached the request for analysis to the specimen container by use of tapes or a rubber band.	______	______
6. Forwarded the specimen to the necessary personnel for analysis.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 84

TASK: Perform focal spot test.

STANDARD OF PERFORMANCE OF TASK:

The focal spot(s) must be checked to ensure proper distribution of the voltage across the filament without distortion or cold spots present on the image.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Focal spot test device
Loaded film cassette
Radiographic unit

ENABLING OBJECTIVES:

1. Load film cassette with film.
2. Identify focal spot test device to used.
3. Identify radiographic unit to have focal spot tested.
4. Review established department procedure for performing a focal spot test.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
4. Cusworth, R., (1983). Quality assurance in diagnostic radiology: An eight-step methodology (lesson 1-3). St. Louis, MO: C.V. Mosby Company.
5. Phillips, M. (1987). Ensuring image quality. St. Louis, MO: C.V. Mosby Company.
6. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

*RESOURCES: (cont.)

7. Focal spot film device.
8. Manufacturer's guidelines for focal spot film device.
9. Example bar resolution pattern.
10. Radiographic unit.
11. Manufacturer's operations manual for radiographic unit.
12. Checklist - Performing focal spot test.

TEACHING ACTIVITIES:

1. Discuss types of focal spot test devices including Wisconsin and pinhole test devices. (* 3,4,5 & 6)
2. Explain placement of test device in center of cassette, stressing criticality of precise placement. (* 1,4,5,6,7 & 8)
3. Demonstrate procedure for placing focal spot device in the center of cassette. (* 4,5,6,7 & 8)
4. Discuss procedure for movement of tube head directly over and perpendicular to the test device. (* 2,3,10 & 11)
5. Show students how to center tube head over test device perpendicularly. (* 10 & 11)
6. Identify manufacturer's recommendations for technical factor selection. (* 8 & 11)
7. Conduct a class discussion in the location of focal spots on different radiographic units. (* 3,4,5,6,10 & 11)
8. Show students how to select correct technical factors, focal spot locations, exposure rates. (* 3,4,5,6,10 & 11)
9. Demonstrate procedure for exposing films. (* 1,2,3,10 & 11)
10. Review process for processing exposed film. (* 1,2,3,4,5 & 6)
11. Explain how to compare exposed film image to focal spot test pattern. (* 1,9 & 11)
12. Demonstrate procedure for verifying focal spot test image to established focal spot test pattern. (* 1,9 & 11)
13. Monitor student's practicing performing focal spot test. (* 7,9 & 10)
14. Assign student's to perform a focal spot test. (* 12)

CRITERION-REFERENCED MEASURE:

The student must center the focal spot test device on the film cassette, center the radiographic unit's tube head perpendicularly over test device, select technical factors, expose film, process film and verify the radiographic image to the focal spot test pattern.

PERFORMANCE GUIDE:

1. Place the loaded film cassette, screen side up, on a stable flat working surface.
2. Place the focal spot test device in the center of the cassette.
3. Center the tube head of the radiographic unit to be tested over the test device. Be sure the tube head is perpendicular to the device.
4. Establish and select the technique as prescribed by the manufacturer's recommendations.
5. Make the exposure, after selecting the focal spot size to be tested.
6. Process the film.
7. Review the finished radiograph to ensure an even pattern is present on the recorded image.
   NOTE: The pattern should be clear and distinct with no distortion or blank areas.
8. Repeat the above for all focal spots on the unit.
   NOTE: If no defects are noted, the unit is functional. If defects are noted, repeat test. If unit still fails, report unit to the supervisor for corrective action.

CHECKLIST

DUTY Performing Support Services

TASK Perform focal spot test.

ENABLER

1. Load film cassette with film.
2. Identify focal spot test device to used.
3. Identify radiographic unit to have focal spot tested.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform focal spot test.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Placed the loaded film cassette, screen side up, on a stable flat working surface.		
2.	Placed the focal spot test device in the center of the cassette.		
3.	Centered the tube head of the radiographic unit to be tested over the test device. Made sure the tube head was perpendicular to the device.		
4.	Established and selected the technique as prescribed by the manufacturer's recommendations.		
5.	Made the exposure, after selecting the focal spot size to be tested.		
6.	Processed the film.		
7.	Reviewed the finished radiograph to ensure an even pattern was present on the recorded image.		
8.	Repeated the above for all focal spots on the unit.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 85

TASK: Perform spot film test.

STANDARD OF PERFORMANCE OF TASK

The results of this test must determine the proper quality of the spot film device of the radiographic device being tested. The test will be performed using proper recommended technique and yield a record of the radiographic units performance.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Lead apron/gloves
Radiographic spot film
Radiographic spot device

ENABLING OBJECTIVES:

1. Identify spot film to be used in test.
2. Load spot film in film carriage of radiographic unit to be tested.
3. Locate lead apron and gloves.
4. Review established department procedure for performing spot film test.

*RESOURCES:

1. Department policy/procedure manual.
2. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
4. Cusworth, R., (1983). Quality assurance in diagnostic radiology: An eight-step methodology (lesson 1-3). St. Louis, MO: C.V. Mosby Company.
5. Phillips, M. (1987). Ensuring image quality. St. Louis, MO: C.V. Mosby Company.

*RESOURCES: (cont.)

6. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Radiographic spot film.
8. Radiographic spot device.
9. Spot film test device.
10. Manufacturer's guidelines for spot film test device.
11. Radiographic unit.
12. Manufacturer`s guidelines for radiographic unit.
13. Quality control log.
14. Checklist - Performing spot film test.

TEACHING ACTIVITIES:

1. Explain procedure for positioning spot film test device on working surface. (* 1,4,5 & 6)
2. Demonstrate how to position test device flat on the working surface. (* 4,5,6,9,10 & 11)
3. Discuss how to formulate exposure factors based on test device manufacturer's recommendations. (* 4,5,6,10 & 12)
4. Display procedure for selecting technical factors using manufacturer's recommendations. (* 4,5,6,8 & 11)
5. Show students how to don lead apron and gloves. (* 1)
6. Review procedure for operating radiographic unit. (* 4,5,6,8 & 11)
7. Discuss the number of exposures need to make the test. (* 1)
8. Review procedure for processing film. (* 1,10, & 12)
9. Demonstrate how to process radiographic film. (* 1,7,11 & 12)
10. Identify the resolution, screen contact, linearity and reproducibility according to manufacturer's specification. (* 4,5,6,10 * 12)
11. Show how to assess the film for resolution, screen contact, linearity and reproducibility. (* 7,10 & 12)
12. Discuss procedure for recording test results in quality control log. (* 13)
13. Show students how to log test results in quality control log. (* 1 & 13)
14. Monitor student's practicing performing spot film test. (* 7,8,9,10,11 & 12)
15. Assign student to perform a spot film test. (* 14)

CRITERION-REFERENCED MEASURE:

The student must position film test device on the work surface, select technical factors, don lead apron and gloves, make required number of exposures, develop exposed film, assess films for resolution, screen contact, linearity and reproducibility, and log test results in quality control log.

PERFORMANCE GUIDE:

1. Insert the spot film in the carriage of the radiographic unit being tested.
2. Place the test device on the working surface.
3. Select the exposure factors recommended by the test device manufacturer.
4. Don a lead apron and gloves during operation of the spot device.
5. Select the proper factors and make the required exposures per manufacturer's specifications.
6. Develop the exposed radiographic film.
7. Examine the film to ensure resolution, screen contact, linearity, and reproducibility are within manufacturer's specifications.
   NOTE: If the results are satisfactory, consider the unit operational. If not, repeat the test. If the unit needs parts, notify the proper personnel.
8. Log the results in the quality control record.

CHECKLIST

DUTY Performing Support Services

TASK Perform spot film test.

ENABLER

1. Identify spot film to be used in test.
2. Load spot film in film carriage of radiographic unit to be tested.
3. Locate lead apron and gloves.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform spot film test.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Inserted the spot film in the carriage of the radiographic unit being tested.		
2.	Placed the test device on the working surface.		
3.	Selected the exposure factors recommended by the test device manufacturer.		
4.	Donned a lead apron and gloves during operation of the spot device.		
5.	Selected the proper factors and made the required exposures per manufacturer's specifications.		
6.	Developed the exposed radiographic film.		
7.	Examined the film to ensure resolution, screen contact, linearity, and reproducibility were within manufacturer's specifications.		
8.	Logged the results in the quality control record.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 86

TASK: Perform spin top test.

STANDARD OF PERFORMANCE OF TASK:

The results of the spin top test will evaluate the operational status of the radiographic unit. The results must determine, if the unit is within manufacturer's specifications or non-operational for use.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Spin top device
Radiographic film/holder
Radiographic unit

ENABLING OBJECTIVES:

1. Establish which radiographic unit is to be tested.
2. Identify type of spin top device to be used.
3. Identify manufacturer's specifications for radiographic unit to be tested.
4. Review established department protocol for performing a spin top test.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Bushong, S., (1984). Radiologic science for technologists: Physics, biology and protection (3rd ed.). St. Louis, MO: C.V. Mosby Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
5. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.

*RESOURCES: (cont.)

6. Cusworth, R., (1983). Quality assurance in diagnostic radiology: An eight-step methodology (lesson 1-3). St. Louis, MO: C.V. Mosby Company.
7. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
8. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
9. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
10. Spin top device.
11. Spin top device manufacturer's specifications.
12. Quality control record.
13. Checklist - Performing spin top test.

TEACHING ACTIVITIES:

1. Discuss types of spin top devices. (* 2,5,6,9 & 10)
2. Explain how to position the spin top device on the film holder. (* 1,6,9 & 11)
3. Review procedure for collimating the radiographic beam stressing the importance of precise collimation for accurate test results.
4. Demonstrate procedure for spin top positioning and radiographic beam collimation. (* 1,2,3,4,7 & 8)
5. Show students how to turn on the spin top device and make an exposure per manufacturers guidelines. (* 6,9,10 & 11)
6. Discuss and demonstrate how to remove spin top device from film holder. (* 6,9,10 & 11)
7. Review procedure for processing radiographic film. (* 2,3,4,5,7 & 8)
8. Explain procedure for comparing the pattern imaged on the film to the manufacturer's specifications.
9. Discuss department protocol for a unit that is not within acceptable specifications. (* 1)
10. Demonstrate procedure for logging spin top test results in quality control record. (* 1,6,9 & 12)
11. Monitor student's practicing performing a spin top test. (* 10)
12. Assign students to perform a spin top test. (* 13)

CRITERION-REFERENCED MEASURE:

The student must identify spin top device to be used, position device on the radiographic film holder, collimate the radiographic beam, make a radiographic exposure, process the exposed film, compare imaged pattern to manufacturer's specification and log test results in quality control record.

PERFORMANCE GUIDE:

1. Place the spin top on the film holder.
2. Collimate the radiographic beam down to the size of the spin top device being used.
3. Turn on the spin top test device and make exposure per manufacturer's guidelines.
4. Remove the device from the film.
5. Develop the exposed radiographic film.
6. Compare the pattern with the manufacturer's specification. If within specs, consider the unit operational. If not, repeat the test.
7. Notify the proper personnel if the unit still fails the spin top test.
8. Log the results in the quality control record.

CHECKLIST

DUTY Performing Support Services

TASK Perform spin top test.

ENABLER

1. Establish which radiographic unit is to be tested.
2. Identify type of spin top device to be used.
3. Identify manufacturer's specifications for radiographic unit to be tested.

STUDENT'S NAME________________________ **DATE**__________

EVALUATOR'S NAME________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform spin top test.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Placed the spin top on the film holder.		
2.	Collimated the radiographic beam down to the size of the spin top device being used.		
3.	Turned on the spin top test device and made exposure per manufacturer's guidelines.		
4.	Removed the device from the film.		
5.	Developed the exposed radiographic film.		
6.	Compared the pattern with the manufacturer's specification.		
7.	Notified the proper personnel if the unit still failed the spin top test.		
8.	Logged the results in the quality control record.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 87

TASK: Prepare fluoroscopic spot film device.

STANDARD OF PERFORMANCE OF TASK:

The photospot camera film must advance smoothly and without fogging.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Film
Photospot camera
Film magazine

ENABLING OBJECTIVES:

1. Identify exams/procedures which utilize a fluoroscopic (photospot) camera.
2. Review established department protocol for using a fluoroscopic spot film device.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P., (1985). Merrill's atlas of radiographic positions and radiographic procedures (Vol. 1). St. Louis, MO: C.V. Mosby Company.
3. Chesney, D. and Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
4. Marglis, A. and Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
5. Whitehouse, G. and Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Scientific Publications Ltd.
6. Sample photospot films.
7. Fluoroscopic spot film device.
8. Checklist - Preparing photospot film.

TEACHING ACTIVITIES:

1. Present lecture on the different type of fluoroscopic spot film devices. (* 2 & 3).

TEACHING ACTIVITIES: (cont.)

2. Discuss roll film and cut film photospot devices. (* 2,3 & 6).
3. Question students on the radiologic applications of a fluoroscopic spot film device. (* 1,2,3,4 & 5)
4. Present lecture on film loading procedures for a photospot device. (* 1,2,3,4 & 5).
5. Demonstrate procedure for loading photospot film into spot film device. (* 2 & 3)
6. Monitor students while they practice loading a spot film device. (* 6 & 7)
7. Demonstrate procedure for unloading film from a spot film device. (* 2,3 & 4)
8. Monitor students while they practice unloading a spot film device. (* 6 & 7)
9. Assign students spot film, a spot film device and instruct students to prepare the spot film device for testing. (* 8)

CRITERION-REFERENCED MEASURE:

The student must identify the test/procedure needing the spot film device, establish the type of spot film device and spot film needed, load the film into the spot film device before test and unload the film after the test.

PERFORMANCE GUIDE:

1. Determine type of photospot camera.
2. Select film according to camera.
3. Load and unload a roll film photospot camera:
   A. Open camera and insert film into film receiver.
   B. Route film according to the manufacturer's instructions.
   C. Close camera.
   D. Advance camera manually several times to completely move film through camera.
   E. Advance film manually following exposure(s) to unload camera.
   F. Open camera, remove empty film roller.
   G. Remove film receiver.
4. Load and unload a cut film photospot camera:
   NOTE: Magazine must be loaded and unloaded in a darkroom.
      A. Place film in magazine.
      B. Place magazine on camera.
      C. Lock magazine in place.

PERFORMANCE GUIDE: (cont.)

4. Load and unload a cut film photospot camera: (cont.)

    D. Lock film receiver in place.
    E. Unlock film receiver and remove film magazine from camera.
    F. Remove film from magazine in the darkroom and place film in processor.

CHECKLIST

DUTY Performing Support Service

TASK Prepare fluoroscopic spot film device.

ENABLER

1. Identify procedure/test utilizing the spot film device.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's performance when preparing the fluoroscopic spot film device.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Identified type of spot film device.	_______	_______
2.	Selected film according to type of spot film device.	_______	_______
3.	Loaded film according to manufacturer's instructions.	_______	_______
4.	Advanced photospot film into position.	_______	_______
5.	Unloaded spot film from spot film device in the darkroom.	_______	_______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 88

TASK: Test cassettes for screen contact.

STANDARD OF PERFORMANCE OF TASK:

The cassette must make complete screen contact and show no zones of blurring.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Cassette
Wire mesh
Radiographic unit
Radiographic processor
Radiographic film

ENABLING OBJECTIVES:

1. Locate wire mesh test device.
2. Identify cassettes to be tested.
3. Review established department protocol for testing cassettes for film contact.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
4. Cusworth, R. (1983). Quality assurance in diagnostic radiology: An eight-step methodology (lesson 1-3). St. Louis, MO: C.V. Mosby Company.
5. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
6. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Wire mesh test device.
8. Radiographic film cassettes.

***RESOURCES:** (cont.)

9. Quality control record.
10. Checklist - Testing film cassettes for screen contact.

TEACHING ACTIVITIES:

1. Discuss different types of wire mesh test devices and radiographic film cassettes. (* 3,4 & 6)
2. Explain procedure for placing wire mesh test device over the film cassette, stressing the importance of precise wire mesh placement to obtain optimum test results. (* 1,3,4 & 6)
3. Demonstrate how to place wire mesh test device over film cassette. (* 7 & 8)
4. Review film cassette positioning procedures. (* 1,2,3 & 5)
5. Show students how to position the film cassette on the radiographic device. (* 7 & 8)
6. Review radiographic film exposure factors stressing the need for correct exposure to visualize cassette defects. (* 1,2 & 5)
7. Demonstrate how to set exposure factors for screen contact test. (* 1,4 & 6)
8. Review process for exposing film and processing the exposed film. (* 1,2,3,4,5 & 6)
9. Review procedure for placing processed radiographs on view box. (* 1,2,3 & 5)
10. Explain types of cassette defects and how they appear on the test radiograph. (* 4 & 6)
11. Demonstrate how to assess a test radiograph for a cassette defects and blurring. (* 4 & 6)
12. Explain procedure for defective cassettes. (* 1)
13. Show students how to record test results in quality control record. (* 1 & 9)
14. Monitor students practicing testing cassettes for screen contact. (* 7 & 8)
15. Assign students to test film cassettes for screen contact. (*10)

CRITERION-REFERENCED MEASURE:

The student must place the wire mesh test device over the film cassette, position cassette on radiographic device, set exposure factors, make exposures, process exposed film, check radiograph for signs of cassette defects and record the test results in the quality control record.

PERFORMANCE GUIDE:

1. Place wire mesh over cassette.
2. Position cassette.
3. Set exposure factors (usually 50 Kv.P., 1/20 second, 50 Ma., 36-inch focal-film distance).
4. Make exposure.
5. Process film.
6. Check radiograph for zones of blurring.
7. Record test results in quality control record.

CHECKLIST

DUTY Performing Support Services

TASK Test cassettes for screen contact.

ENABLER

1. Locate wire mesh test device.
2. Identify cassettes to be tested.

STUDENT'S NAME________________________ **DATE**__________

EVALUATOR'S NAME______________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to test cassettes for screen contact.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Placed wire mesh over cassette.	______	______
2.	Positioned cassette.	______	______
3.	Set exposure factors (usually 50 Kv.P., 1/20 second, 50 Ma., 36-inch focal-film distance).	______	______
4.	Made exposure.	______	______
5.	Processed film.	______	______
6.	Checked radiograph for zones of blurring.	______	______
7.	Recorded test results in quality control record.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 89

TASK: Perform x-ray beam alignment test.

STANDARD OF PERFORMANCE OF TASK:

The beam alignment test must be performed according to manufacturer's specifications to satisfactorily yield a record of the radiographic beam and light field alignment to within + or - 5% of each other.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Radiographic film/holder
Radiographic unit
Opague markers
Template/alignment test device

ENABLING OBJECTIVES:

1. Identify radiographic unit to be tested.
2. Identify manufacturer's specifications for beam alignment
3. Review established department protocol for x-ray beam alignment.

***RESOURCES:**

1. Department policy/procedure manual.
2. Armstrong, P., & Wastie, M. (1986). Diagnostic imaging. Boston, MA: Blackwell Scientific Publications Ltd.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
5. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
6. Chesney, D., & Chesney, M. (1981). Radiographic imaging (4th ed.). Boston, MA: Blackwell Scientific Publications Ltd.

*RESOURCES: (cont.)

7. Cusworth, Rita. (1983). Quality assurance in diagnostic radiology: An eight-step methodology (lesson 1-3). St. Louis, MO: C.V. Mosby Company.
8. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
9. Weir, J., & Abrahams, P. (1978). An atlas of radilogical anatomy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
10. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
11. Thompson, T. (1980). A practical approach to modern imaging equipment (2nd ed.). Boston, MA: Little, Brown and Company.
12. Radiographic film holder cassette.
13. Radiographic unit.
14. Radiographic units manufacturer's guidelines.
15. Alignment test device.
16. Quality control record.
17. Checklist - Performing beam alignment test.

TEACHING ACTIVITIES:

1. Review types of radiographic film holders and how they are placed on the radiographic unit. (* 2,3,4,5,6 & 7)
2. Demonstrate placement of film holders on radiographic unit. (* 12 & 13)
3. Review location and operation of collimator. (* 1,2,3,4,5,13 & 14)
4. Show students how to move collimator and position it over film holder. (* 13 & 14)
4. Show students how to move collimator and position it over film holder. (* 13 & 14)
5. Explain how to operate collimator light field. (* 13,14 & 15)
6. Demonstrate how to adjust the light field to at least one inch within the exposed film. (* 13,14 & 15)
7. Discuss opaque markers and demonstrate their placement at the corners of the light field on the film holder. (* 2,3,8 & 9)
8. Explain the types and uses of beam alignment test devices. (* 1,2,3,5,9 & 15)
9. Demonstrate procedure for placing beam alignment marker in the exact center of the light field. (* 2,5,6,7,9 & 10)
10. Identify procedure to verify that collimator is perpendicular to the film holder. (* 1,2,3 & 4)

TEACHING ACTIVITIES: (cont.)

11. Show students how to utilize a template to collimate beam. (* 6,7,8,9 & 11)
12. Review procedure for exposing radiographic film. (* 2,3,4,6,7,8,9 & 11)
13. Review process for processing exposed film. (* 2,3,4,6,7,8,9 & 11)
14. Demonstrate method for evaluating radiograph for collimator perpendicularity and light field to radiographic beam alignments. (* 11 & 14)
15. Explain how to interpret manufacturer's recommended specification to the achieved results. (* 1 & 14)
16. Discuss action to be taken if test results are not within manufacturer's specifications. (* 1)
17. Discuss and demonstrate how to log test results in quality control record. (* 16)
18. Monitor students practicing x-ray beam alignment.
19. Assign students to perform a x-ray beam alignment. (* 17)

CRITERION-REFERENCED MEASURE:

The student must place the radiographic film holder on the radiographic unit, align collimator and light field to center, place opaque markers at corners of the light field. Place alignment template over film holder in exact center of light field, expose the film, compare test results to manufacturer's specifications, and record test results in quality control graph.

PERFORMANCE GUIDE:

1. Place the radiographic film holder on the working surface.
2. Position the collimator over the holder.
3. Turn the light field on.
4. Collimate the light field down so the exposure will appear within the confines of at least one inch unexposed on the film.
5. Place suitable opaque markers at the corners of the light field. This will illustrate the light field on the exposed images in relationship to the actual area of exposures.
6. Place the beam alignment test device in the exact center of the light field.
7. Ensure that the collimator is perpendicular to the radiographic film holder.

PERFORMANCE GUIDE: (cont.)

8. Place the template on the radiographic film holder. If a beam alignment template is used, collimate to the defined manufacturer's edges. Place the alignment tool at the designated center.
9. Make the exposure per manufacturer's recommendations.
10. Process the exposed film.
11. Evaluate the record for perpendicularly and light field to radiographic beam alignment per manufacturer's guidelines.
12. Verify that the results are within manufacturer's recommended specifications.
    NOTE: If the unit meets the established criteria, the unit will be considered operational. If the unit falls outside the limits, repeat the test.

CHECKLIST

DUTY Performing Support Services

TASK Perform x-ray beam alignment test.

ENABLER

1. Identify radiographic unit to be tested.
2. Identify manufacturer's specifications for beam alignment.

STUDENT'S NAME ______________________________ DATE __________

EVALUATOR'S NAME ____________________________ COURSE ________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform x-ray beam alignment test.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Placed the radiographic film holder on the working surface.		
2.	Positioned the collimator over the holder.		
3.	Turned the light field on.		
4.	Collimated the light field down so the exposure appeared within the confines of at least one inch unexposed on the film.		
5.	Placed suitable opague markers at the corners of the light field.		
6.	Placed the beam alignment test device in the exact center of the light field.		
7.	Ensured that the collimator was perpendicular to the radiographic film holder.		
8.	Placed the template on the radiographic film holder.		
9.	Made the exposure per manufacturer's recommendations.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Processed the exposed film.	________	________
11. Evaluated the record for perpendicularly and light field to radiographic beam alignment per manufacturer's guidelines.	________	________
12. Verified that the results were within manufacturer's recommended specifications.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 90

TASK: Place film on illuminators.

STANDARD OF PERFORMANCE OF TASK:

The illuminator must be turned on and the top of the film placed in the spring holder, so the right side of image is on the viewer's left.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Film illuminator
Developed radiograph film

ENABLING OBJECTIVES:

1. Locate radiographs to be placed on illuminator.
2. Identify type of illuminator (viewbox) to be used.

*RESOURCES:

1. Department policy/procedure manual.
2. Armstrong, P., & Wastie, M. (1986). Diagnostic imaging. Boston, MA: Blackwell Scientific Publications Ltd.
3. Ansell, G., & Wilkins, R. (1987). Complications in diagnostic imaging. Boston, MA: Blackwell Scientific Publications Ltd.
4. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
5. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
6. Chesney, D., & Chesney, M. (1981). Radiographic imaging (4th ed.). Boston, MA: Blackwell Scientific Publications Ltd.
7. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
8. Illuminator/viewbox.

*RESOURCES: (cont.)

9. Developed radiographs.
10. Checklist - Placing radiographs on illuminator.

TEACHING ACTIVITIES:

1. Discuss the different types of illuminators and how they work. (* 3,5,6 & 7)
2. Explain the operation procedure for an illuminator. (* 2,3,6 & 7)
3. Demonstrate how to turn illuminator on and place a radiograph under the illuminator clamp. (* 8 & 9)
4. Review radiograph identification and positioning. (* 1,4,5 & 9)
5. Show student how to locate identification blocker, top, bottom, right and left of radiograph. (* 1,4,5 & 9)
6. Monitor students practicing placing radiographs on illuminator. (* 8 & 9)
7. Assign students to place film on illuminator. (* 10)

CRITERION-REFERENCED MEASURE:

The student must obtain developed radiographs, turn on illuminator and place the radiograph on the illuminator with the right side of image to the left of viewer and the top under the spring clip.

PERFORMANCE GUIDE:

1. Obtain developed radiographs.
2. Turn on illuminator.
3. Identify top of radiograph and place film in spring clamp.
4. Verify that right side of image is on the left of viewer.

CHECKLIST

DUTY Performing Support Services

TASK Place film on illuminators.

ENABLER

1. Locate radiographs to be placed on illuminator.
2. Identify type of illuminator (viewbox) to be used.

STUDENT'S NAME____________________ DATE__________

EVALUATOR'S NAME____________________ COURSE__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to place film on illuminators.

PERFORMANCE DETERMINANTS	YES	NO
1. Obtained developed radiographs.	______	______
2. Turned on illuminator.	______	______
3. Identified top of radiograph and placed film in spring clamp.	______	______
4. Verified that right side of image was on the left of viewer.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 91

TASK: Draw blood sample.

STANDARD OF PERFORMANCE OF TASK:

The sample puncture site must be selected and cleaned using aseptic technique at all times. The blood sample drawn must be of sufficient quantity to perform prescribed examination. The sample must be labeled with patient's name, date, time drawn, and requisition number.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's request
Patient's chart
Patient's identification.
Alcohol swab
Adhesive bandage
Sample tubes
Sample tube labels
Blood sample collection system

ENABLING OBJECTIVES:

1. Locate puncture site blood is to be drawn from.
2. Identify quantity of blood needed.
3. Assemble blood sample collection list.
4. Review established department protocol for drawing a blood sample.

***RESOURCES:**

1. Department policy/procedure manual.
2. Alpert, J., & Wittenburg, S. (1986). Clinicians companion: A study guide for effective and human patient care. Boston, MA: Little, Brown and Company.
3. Klippel, A., & Anderson, C. (1979). Manual of emergency and outpatient techniques. Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

4. Levy, B., & Wegman, D. (1982). Occupational health: Recognizing and preventing work-related diseases. Boston, MA: Little, Brown and Company.
5. Mandell, L., & Ralph, E. (1985). Essentials of infectious diseases. Boston, MA: Blackwell Scientific Publications Ltd.
6. Salm, T., Cutler, B., & Wheeler H. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.
7. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
8. Keats, T. (1984). Emergency radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
9. Blood collection system.
10. Checklist - Drawing blood sample.

TEACHING ACTIVITIES:

1. Discuss patient identification verification procedure. (* 1)
2. Conduct class discussion stressing importance of explaining procedure to patient and obtaining patient's permission prior to starting procedure. (* 1)
3. Explain sample tube label information. (* 1,2,6 & 7)
4. Demonstrate sample tube labeling procedure. (* 1,2,6,7 & 9)
5. Conduct class discussion about blood transmitted infectious diseases. (* 4 & 5)
6. Show students preventive measure for avoiding contact with contagious/infectious diseases. (* 4 & 5)
7. Explain procedure for applying a tourniquet above the patient's elbow and palpating arm at elbow to locate vein. (* 2,3,6,7 & 8)
8. Demonstrate tourniquet application and vein palpation. (* 2,3,6 & 7)
9. Review method for selecting and cleaning needle insertion site. (* 1,2,3,6 & 7)
10. Demonstrate procedure for cleaning needle insertion site. (* 2,3,6 & 7)
11. Discuss and demonstrate procedure for needle insertion into vein. (* 2,3,6 & 7)
12. Demonstrate procedure for withdrawing blood into collection system. (* 2,3,6,7 & 9)
13. Explain procedure for release of tourniquet and withdrawal of needle while applying pressure to puncture site. (* 2 & 3)

TEACHING ACTIVITIES: (cont.)

14. Discuss and demonstrate aseptic technique for dressing injection site. (* 2 & 7)
15. Show students the method for transferring blood samples from collection system to sample vials and how to secure sample vials for transfer. (* 2 & 7)
16. Explain department protocol for forwarding blood samples to laboratory. (* 1)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification, explain procedure to the patient, obtain patient's permission for procedure in writing, label sample tubes with patient information, perform blood withdrawal procedure, transfer sample from collection system to sample tubes, secure labeled sample tubes for transfer and forward samples to lab.

PERFORMANCE GUIDE:

1. Verify physician's order and patient identification.
2. Greet patient and explain procedure.
3. Obtain patient's permission to draw blood sample.
4. Label sample tube with patient's name, date, time drawn, and requisition number.
5. Apply tourniquet above elbow and palpate arm at elbow to find vein.
6. Clean insertion site with an alcohol swab, using a circular motion outward away from site maintaining aseptic technique.
7. Insert needle of collection system into vein.
8. Withdraw blood using collection system.
9. Release tourniquet and withdraw needle from vein, applying slight pressure over insertion site with gauze or cotton swab.
10. Apply adhesive bandage to injection site.
11. Forward sample to lab for examination.

CHECKLIST

DUTY Performing Support Services

TASK Draw blood sample.

ENABLER

1. Locate puncture site blood is to be drawn from.
2. Identify quantity of blood needed.
3. Assemble blood sample collection list.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to draw blood sample.

PERFORMANCE DETERMINANTS	YES	NO
1. Verified physician's order and patient identification.		
2. Greeted patient and explained procedure.		
3. Obtained patient's permission to draw blood sample.		
4. Labeled sample tube with patient's name, date, time drawn, and requisition number.		
5. Applied tourniquet above elbow and palpated arm at elbow to find vein.		
6. Cleaned insertion site with an alcohol swab, using a circular motion outward away from site maintaining aseptic technique.		
7. Inserted needle of collection system into vein.		
8. Withdrew blood using collection system.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Released tourniquet and withdrew needle from vein, applying slight pressure over insertion site with gauze or cotton swab.	________	________
10. Applied adhesive bandage to injection site.	________	________
11. Forwarded sample to lab for examination.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 92

TASK: Test accuracy of scan camera.

STANDARD OF PERFORMANCE OF TASK:

The flood source must demonstrate the accuracy of data acquisition by the scan camera in terms of complete image uniformity and linearity without any distortion in terms of shape and size to the acquired image.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Scan camera
Cobalt flood source
Imaging modality

ENABLING OBJECTIVES:

1. Identify scan camera to be tested.
2. Locate flood source to be used in test.
3. Review established department protocol for testing the accuracy of scan camera.

*RESOURCES:

1. Department policy/procedure manual.
2. Ballinger, P. (1986). _Merrill's atlas of radiographic positions and radiologic procedures_. St. Louis, MO: C.V. Mosby Company.
3. Cusworth, R. (1983). _Quality assurance in diagnostic radiology: An eight-step methodology_ (lesson 1-3). St. Louis, MO: C.V. Mosby Company.
4. McLemore, J. (1981). _Quality assurance in diagnostic radiology_. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Scan camera.
6. Cobalt flood source.
7. Collimator.
8. Recording device and media.
9. Checklist - Testing accuracy of scan camera.

TEACHING ACTIVITIES:

1. Explain and show students how to install general purpose collimator on camera head. (* 1 & 7)
2. Demonstrate how to place the cobalt flood source under the camera head. (* 2,3 & 4)
3. Explain and demonstrate how to lower the camera head to bring the flood source surface in uniform contact with the collimator face. (* 3,4,6 & 7)
4. Demonstrate how to pack the camera for the source. (* 3,4,5 & 6)
5. Review department directives for acquiring the image. (* 1)
6. Show students how to acquire the image. (* 1 & 2)
7. Review and demonstrate how to record the image on the approved recording media. (* 2,5 & 8)
8. Instruct and show the students how to review the image to determine there is uniformity throughout the image in terms of density. (* 1 & 8)
9. Instruct students to observe the shape and size for distortion, magnification, or reduction. (* 8)
10. Conduct class discussion on determining if image is acceptable. (* 1,3 & 4)
11. Review the procedure used to report malfuncton to the supervisor if the unit fails. (* 1)
12. Monitor students as they practice testing accuracy of scan camera. (* 5,6,7 & 8)
13. Supervise and evaluate students testing accuracy of scan cameras. (* 9)

CRITERION-REFERENCED MEASURE:

The student must install collimator on camera head, position cobalt flood source, lower camera head into contact with collimator face, pack the camera, acquire image, record the image on recording media, review image and determine if unit acquisition is acceptable.

PERFORMANCE GUIDE:

1. Install general purpose collimator on the camera head.
2. Place the cobalt flood source under the camera head, centering it to the camera.
   NOTE: Ensure no air bubbles are present in the flood source, if using a fluid type source.
3. Lower the camera head to bring the flood source surface in uniform contact with the collimator face.
4. Pack the camera for the source.

PERFORMANCE GUIDE: (cont.)

5. Acquire the image as prescribed by department directives.
6. At the completion of acquisition, record the image on the approved recording media.
7. Review the image to determine there is uniformity of the image in terms of density and no holes on darkened area are present.
8. Observe the shape and size for distortion, magnification, or reduction.
9. If the image is acceptable, deem the unit functional. If not, repeat the test.
10. If the unit fails, report the malfunction to the supervisor for corrective action.

CHECKLIST

DUTY Performing Support Services

TASK Test accuracy of scan camera.

ENABLER

1. Identify scan camera to be tested.
2. Locate flood source to used in test.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to test accuracy of scan camera.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Installed general purpose collimator on the camera head.		
2.	Placed the cobalt flood source under the camera head, centering it to the camera.		
3.	Lowered the camera head to bring the flood source surface in uniform contact with the collimator face.		
4.	Packed the camera for the source.		
5.	Acquired the image as prescribed by department directives.		
6.	Recorded the image on the approved recording media at the completion of acquisition.		
7.	Reviewed the image to where there was uniformity throughout the image in terms of density, and no holes on darkened area were present.		
8.	Observed the shape and size for distortion, magnification, or reduction.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Deemed the unit acquisition accurate if the image was acceptable.	________	________
10. Reported the malfunction to the supervisor for corrective action.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 93

TASK: Maintain non-prescription stock in examining room.

STANDARD OF PERFORMANCE OF TASK:

The examination room must contain an adequate supply of all non-prescription stock according to hospital's established guidelines.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Supply cart
Non-prescription supply room
List of non-prescription stock maintained in examining room

ENABLING OBJECTIVES:

1. Identify examining room to be stocked.
2. Review established department policy concerning non-prescription stock.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. List of non-prescription stock.
4. Stock inventory sheet.
5. Stock room checkout invoice.
6. Checklist - Stocking non-prescription drugs in examining room.

TEACHING ACTIVITIES:

1. Conduct class discussion on what non-prescription stock is. (* 1,2 & 3)
2. Review list of non-prescription stock. (* 3)
3. Show students non-prescription stock inventory sheet. (* 4)

TEACHING ACTIVITIES: (cont.)

4. Explain procedure for inventorying the non-prescription stock in an examining room. (* 1,2 & 4)
5. Demonstrate how to inventory an examination room. (* 3 & 4)
6. Show students how to calculate the number of units of stock needed. (* 1)
7. Explain where non-prescription replacement stock is obtained. (* 1 & 3)
8. Discuss and demonstrate procedure for checking out replacement stock. (* 5)
9. Discuss location of items to be restocked. (* 1)
10. Demonstrate procedure for restocking examination room. (* 1 & 2)
11. Discuss the need to document depleted stock, stock obtained and stock replenished for department records. (* 1 & 2)
12. Demonstrate how to document the restocking of the examination room. (* 4)
13. Instruct students to practice taking inventory of non-prescription stock in the examination room. (* 3,4 & 5)
14. Assign students to maintain the non-prescription stock in an examining room. (* 6)

CRITERION-REFERENCED MEASURE:

The student must conduct an inventory of the non-prescription stock, calculate stock needed to replenish supply, obtain replacement stock, restock the non-prescription drugs in the examining room and document the restocking for department records.

PERFORMANCE GUIDE:

1. Obtain list of non-prescription drugs maintained in examining room.
2. Conduct inventory of non-prescription stock in examining room and compare to required stock list.
3. Record number of units of each stock item needing replenished.
4. Obtain needed items from stock room and place on supply cart.
5. Sign stock room checkout/invoice.
6. Restock examining room to required amounts.
7. Document restocking procedure.

CHECKLIST

DUTY Performing Support Services

TASK Maintain non-prescription stock in examining room.

ENABLER

1. Identify examining room to be stocked.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME_____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to maintain non-prescription stock in examining room.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Obtained list of non-prescription drugs maintained in examining room.		
2.	Conducted inventory of non-prescription stock in examining room and compared to required stock list.		
3.	Recorded number of units of each stock item needing replenished.		
4.	Obtained needed items from stock room and placed on supply cart.		
5.	Signed stock room checkout/invoice.		
6.	Restocked examining room to required amounts.		
7.	Documented restocking procedure.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 94

TASK: Prepare subtraction prints.

STANDARD OF PERFORMANCE OF TASK:

Produce a film of unobserved opacified vessels containing contrast material from a film of the bone plus opacified vessels.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Zero film
Darkroom
Series film
Contact printer
Subtraction mask film
Subtraction print film
Radiographic processing facilities
Horizontally oriented illuminator

ENABLING OBJECTIVES:

1. List darkroom procedures.
2. Locate opacified vessels containing contrast media.
3. Recall film handling techniques.
4. Review established department procedures for preparing subtraction prints.

***RESOURCES:**

1. Department policy/procedure manual.
2. Armstrong, P., & Wastie, M. (1986). Diagnostic imaging. Boston, MA: Blackwell Scientific Publications Ltd.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D., & Chesney, M. (1981). Radiographic imaging (4th ed.). Boston, MA: Blackwell Scientific Publications Ltd.
5. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

6. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
7. Zero film.
8. Subtraction mask film.
9. Subtraction print film.
10. Radiograph processing facilities.
11. Checklist - Preparing subtraction prints.

TEACHING ACTIVITIES:

1. Explain and show students how to place the non-emulsion side of a sheet of subtraction mask film in contact with the zero film. (* 2,3,4,5,7 & 8)
2. Explain and demonstrate how to expose the film for the length of time specified per film package instructions. (* 1,7,8 & 9)
3. Review and demonstrate how to develop exposed film. (* 3,6 & 10)
4. Instruct and show students how to superimpose the mask film over the series film so the bony structures appear as one image. (* 7,8,9 & 10)
5. Demonstrate how to tape films together. (* 7 & 8)
6. Explain and show students how to place the "mask/series" combination in contact with the emulsion side of a sheet of subtraction print film. (* 7,8 & 9)
7. Instruct and demonstrate how to expose film to light for specified length of time. (* 3,4 & 5)
8. Review and demonstrate how to develop exposed image. (* 2,4,5,6 & 10)
9. Monitor students as they practice preparing subtraction prints. (* 7,8,9 & 10)
10. Supervise and evaluate students preparing subtraction prints. (* 11)

CRITERION-REFERENCED MEASURE:

The student must place the non-emulsion side of the subtraction mask film in contact with the zero film, expose film, develop exposed film, superimpose "mask" film over "series" film, tape films together, place "mask/series" combination in contract with emulsion side of subtraction print film, expose film to light and develop exposed film.

PERFORMANCE GUIDE:

1. Enter darkroom and place the non-emulsion side of a sheet of subtraction mask film in contact with the zero film.
2. Expose the film for the length of time specified per film package instructions.
3. Develop exposed film.
   NOTE: Developed exposed film will be the "mask".
4. Superimpose the "mask" film over the "series" film, so the bony structures appear as one image on a horizontally oriented illumination.
5. Tape films together, securely.
6. Place the "mask/series" combination in contact with the emulsion side of a sheet of subtraction print film.
7. Expose film to light for length of time specified on film package instructions.
8. Develop exposed image.

CHECKLIST

DUTY Performing Support Services

TASK Prepare subtraction prints.

ENABLER

1. Recall darkroom procedures.
2. Locate opacified vessels containing contrast media.
3. Recall film, handling techniques.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare subtraction prints.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Entered darkroom and placed the non-emulsion side of a sheet of subtraction mask film in contact with the zero film.	______	______
2.	Exposed the film for the length of time specified per film package instructions.	______	______
3.	Developed exposed film.	______	______
4.	Superimposed the "mask" film over the "series" film, so the bony structures appeared as one image on a horizontally oriented illumination.	______	______
5.	Taped films together securely.	______	______
6.	Placed the "mask/series" combination in contact with the emulsion side of a sheet of subtraction print film.	______	______
7.	Exposed to light for length of time specified on film package instructions.	______	______
8.	Developed exposed image.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 95

TASK: Process exposed film in automatic processor.

STANDARD OF PERFORMANCE OF TASK:

The exposed film must be placed in the processor and processed according to manufacturer's specifications. The quality of the film must be checked on an illuminator.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Darkroom
Film illuminator
Exposed radiograph film
Automatic film processor

ENABLING OBJECTIVES:

1. Transport exposed radiograph film to darkroom.
2. Review established department protocol for developing exposed radiograph film.

***RESOURCES:**

1. Department policy/procedure manual.
2. Automatic film processor instruction manual.
3. Gurley, L. and Callaway, W. (1986). Introduction to radiologic technology. St. Louis, MO: C.V. Mosby Company.
4. Ballinger, P. (1986). Merrill's Atlas of radiographic positions and radiographic procedures (Vol. 3). St. Louis, MO: C.V. Mosby Company.
5. Armstrong, P. and Wastie, M. (1986). Diagnostic imaging. Boston MA: Blackwell Scientific Publications.
6. Chesney, D. and Chesney, M. (1984). X-ray equipment for student radiographers. Boston MA: Blackwell Scientific Publications.
7. Chesney, D. and Chesney, M. (1981) Radiographic imaging, (4th ed.). Boston MA: Blackwell Scientific Publications.

***RESOURCES:** (cont.)

8. Automatic film processor procedure outline.
9. Automatic film processor and film supplies.
10. Checklist - Using automatic film processor.

TEACHING ACTIVITIES:

1. Present lecture about darkroom operations. (* 1,3,4,5,6 & 7).
2. Discuss possible areas for white light leaks. (* 3 & 4).
3. Demonstrate procedure for testing for white light leaks.
4. Discuss safelight operating procedure. (* 1,2 & 5)
5. Demonstrate safelight operation procedure. (* 1,2 & 9)
6. Present lecture on types of film processors. (6 & 7)
7. Discuss film cassette/magazine handling. (* 1,6 & 7)
8. Demonstrate procedure for removing exposed film from cassette and placing film on feed tray of processor. (* 9)
9. Demonstrate procedure for operating automatic film processor. (* 9)
10. Monitor students while removing exposed film and during the operation of the automatic film processor.
11. Instruct students to process exposed film in an automatic film processor. (* 10)

CRITERION-REFERENCED MEASURE:

The student must prepare the darkroom, remove exposed film from magazine/cassette, and process the exposed film through the automatic processor.

PERFORMANCE GUIDE:

1. Enter darkroom, turn off white light.
2. Check for white light leaks.
3. Turn on safelight illuminator.
4. Open cassette/magazine.
5. Remove film and place lengthwise on feed tray of automatic processor.
   CAUTION: Do not touch face of film. Grasp by edges.

PERFORMANCE GUIDE: (cont.)

6. Push film forward until it is caught by rollers.
   NOTE: Bell will ring to indicate film is completely in processor and replenishment has stopped.
7. Retrieve processed film when it emerges from processor.
8. Check quality of film on illuminator.

CHECKLIST

DUTY Performing Supplemental Services

TASK Process exposed film in automatic processor.

ENABLER

1. Transport exposed film to automatic processor.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's performance when processing exposed film using an automatic film processor.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Entered darkroom and turned off white light.		
2.	Checked for white light leaks.		
3.	Turned on safelight illuminator.		
4.	Opened cassette/magazine.		
5.	Removed film and placed on feed tray of automatic processor.		
6.	Pushed film forward until caught by rollers.		
7.	Retrieved processed film.		
8.	Checked quality of processed film.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 96

TASK: Duplicate radiographs.

STANDARD OF PERFORMANCE OF TASK:

Duplicated radiographic films must maintain original radiograph's diagnostic quality.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Printer
Safelight
Darkroom
Original radiograph
Duplicating film(s)
Radiograph duplication request
Radiographic processing equipment

ENABLING OBJECTIVES:

1. Review radiograph duplication request.
2. Locate original radiographs.
3. Review established department protocol for duplicating radiographs.

***RESOURCES:**

1. Department policy/procedure manual.
2. Armstrong, P., & Wastie, M. (1986). Diagnostic imaging. Boston, MA: Blackwell Scientific Publications Ltd.
3. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
5. Chesney, D., & Chesney, M. (1981). Radiographic imaging (4th ed.). Boston, MA: Blackwell Scientific Publications Ltd.
6. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

7. Phillips, M. (1987). Ensuring image quality. St. Louis, MO: C.V. Mosby Company.
8. Thompson, T. (1980). A practical approach to modern imaging equipment (2nd ed.). Boston, MA: Little, Brown and Company.
9. Radiograph duplicator/printer.
10. Radiograph duplicator manufacturer's guideline/instructions.
11. Checklist - Duplicating radiographs.

TEACHING ACTIVITIES:

1. Review procedure for darkroom and safelight operation. (* 1,2,3 & 4)
2. Demonstrate darkroom and safelight operation.
3. Identify types of radiograph duplicating film and their location in film bin. (* 1,2,3 & 6)
4. Discuss location of film printer (duplicator). (* 9)
5. Review manufacturer's guideline/instructions for loading and operating film duplicating. (* 9 & 10)
6. Demonstrate procedure for loading and operating the film duplicator. (* 9 & 10)
7. Explain duplicate radiograph development process. (* 2,3,5 & 6)
8. Show students how to develop a duplicate radiograph. (* 9 & 10)
9. Discuss the importance of verifying the duplicate radiograph with the original radiograph. (* 1)
10. Review process for placing radiographs on viewbox. (* 1)
11. Identify checkpoints for verifying quality of duplicated radiograph including density, contrast, lightness, darkness and anatomy imaged. (* 7 & 8)
12. Discuss and demonstrate procedure for placing identification on duplicated radiographs. (* 1,2,3 & 6)
13. Monitor students practicing radiograph duplication. (* 9 & 10)
14. Assign students to duplicate radiographs. (* 11)

CRITERION-REFERENCED MEASURE:

The student must identify type of duplicating film needed, load film in film duplicator, duplicate radiograph, process duplicated radiograph and mark duplicated radiograph with identification information.

PERFORMANCE GUIDE:

1. Review radiograph duplication request.
2. Obtain original radiographs, enter darkroom, and turn on safelight.
3. Identify duplicating film and remove from film bin.
4. Place original film on printer with duplicate film on top of original under safelight conditions.
5. Expose duplicate film per duplicator manufacturer's instructions/guidelines.
   NOTE: The quality of the duplicate may be improved by adjusting the length of exposure.
6. Develop duplicate radiograph.
7. Position original and duplicated radiographs on view box and verify diagnostic quality of duplicate.
   NOTE: Repeat procedure, if duplicate quality is not acceptable.
8. Place identification information on duplicate radiograph.

CHECKLIST

DUTY Performing Support Services

TASK Duplicate radiographs.

ENABLER

1. Review radiograph duplication request.
2. Locate original radiographs.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to duplicate radiographs.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Reviewed radiograph duplication request.		
2.	Obtained original radiographs, entered darkroom, and turned on safelight.		
3.	Identified duplicating film and removed from film bin.		
4.	Placed original film on printer with duplicate film on top of original under safelight conditions.		
5.	Exposed duplicate film per duplicator manufacturer's instructions/guidelines.		
6.	Developed duplicate radiograph.		
7.	Positioned original and duplicated radiographs on view box and veried diagnostic quality of duplicate.		
8.	Placed identification information on duplicate radiograph.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 97

TASK: Clean intensifying screens.

STANDARD OF PERFORMANCE OF TASK:

Intensifying screen must be protected from nicks, scratches, or chips while being cleaned and must be free of smudges and foreign particles.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Cassette
Screen cleaner
Soft cloth (lint-free material)
Blacklight

ENABLING OBJECTIVES:

1. Identify intensifying screens to be cleaned.
2. Assemble cleaning materials.
3. Review established department procedure for cleaning intensifying screens.

***RESOURCES:**

1. Department policy/procedure manual.
2. Armstrong, P., & Wastie, M. (1986). Diagnostic imaging. Boston, MA: Blackwell Scientific Publications Ltd.
3. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
5. Intensifying screens.
6. Cleaning materials.
7. Manufacturer's suggested cleaning procedures.
8. Checklist - Cleaning intensifying lens.

TEACHING ACTIVITIES:

1. Review procedures for loading and unloading cassettes and using the darkroom. (* 1,2,3 & 4)
2. Demonstrate how to unload film from a cassette and store film in film bin. (* 1,2,3 & 4)
3. Explain methods for checking screen for foreign materials such as stains, lint, dirt, etc. (* 2,3 & 4)
4. Show students how to check screens for foreign materials. (* 2,3 & 4)
5. Discuss manufacturer's suggested cleaning materials. (* 6 & 7)
6. Explain manufacturer's recommendations for cleaning intensifying screens. (* 7)
7. Demonstrate method for cleaning intensifying screens. (* 5,6 & 7)
8. Explain the methods for drying the intensifying screens. (* 1,5,6 & 7)
9. Show students the different methods for drying intensifying screens. (* 5)
10. Discuss and demonstrate procedure for verifying that intensifying screen is clean and free of nicks and scratches. (* 2,3,4 & 5)
11. Monitor student's practicing cleaning intensifying screens. (* 5,6 & 7)
12. Assign students to clean an intensifying screen. (* 8)

CRITERION-REFERENCED MEASURE:

The student must unload film from cassette, store film in film bin, check screen for foreign objects, clean the screen, dry the screen and verify that the screen is free of nicks, scratches and dirt.

PERFORMANCE GUIDE:

1. Unload cassette in darkroom.
2. Check for dust or foreign materials.
3. Wash screens with screen cleaner.
   A. Pour cleaner onto soft cloth.
   B. Rub gently in circular direction.
   NOTE: Care must be taken not to nick, scratch, or chip the screens.
4. Dry screen with lint-free material.
5. Stand the half-opened cassette on its side in a dust-free room for further drying.

CHECKLIST

DUTY Performing Support Services

TASK Clean intensifying screens.

ENABLER

1. Identify intensifying screens to be cleaned.
2. Assemble cleaning materials.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to clean intensifying screens.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Unloaded cassette in darkroom.	____	____
2. Checked for dust or foreign materials.	____	____
3. Washed screens with screen cleaner.	____	____
4. Poured cleaner onto soft cloth.	____	____
5. Rubbed gently in circular direction.	____	____
6. Dried screen with lint-free material.	____	____
7. Stood the half-opened cassette on its side in a dust-free room for further drying.	____	____

DUTY: Performing Support Services

PERFORMANCE OBJECTIVE NO. 98

TASK: Clean film processing equipment.

STANDARD OF PERFORMANCE OF TASK:

The processor must be clean and the processing chemicals must not be contaminated. Test film must be clean and the image sharp.

CONDITIONS FOR PERFORMANCE OF TASK:

V-TECS Nuclear Medicine Catalog
Water
Automatic processor
Nonabrasive pad
Radiographic film
Fixer, developer/starter
System cleaner fluid

ENABLING OBJECTIVES:

1. Identify type of film processing equipment to be cleaned.
2. Turn processor off and open processor so parts to be cleaned are accessible.
3. Locate and read film processor's cleaning guidelines as set forth by manufacturer.

***RESOURCES:**

1. Department policy/procedure manual.
2. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
3. Thompson, T. (1980). A practical approach to modern imaging equipment (2nd ed.). Boston, MA: Little, Brown and Company.
4. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
5. Film processing equipment.
6. Film processing chemicals.
7. Film processing equipment manufacturer's guidelines.
8. Film processing equipment operator's manual.
9. Checklist - Cleaning film processing equipment.

TEACHING ACTIVITIES:

1. Explain procedure for accessing and draining processor's chemicals. (* 2,3,7 & 8)
2. Demonstrate method for accessing and draining processor's chemicals. (* 5,6 & 7)
3. Discuss procedure for removing processor racks without chemical contamination. (* 2,3 & 7)
4. Demonstrate procedure for removing processor's racks. (* 5 & 7)
5. Explain how to recognize worn or dirty parts. (* 7)
6. Show students how to remove and replace a part. (* 5 & 7)
7. Review manufacturer's guidelines for cleaning processor parts. (* 6 & 7)
8. Identify cleaning equipment and supplies needed to clean the processor's parts. (* 7 & 8)
9. Demonstrate how to clean dirty parts. (* 5 & 7)
10. Review manufacturer's guidelines for refilling processor with chemicals. (* 7 & 8)
11. Demonstrate how to refill fixer tank and developer tank. (* 5,6,7 & 8)
12. Discuss procedure for reassembly of processor. (* 2,3 & 7)
13. Show students how to replace the racks in the tank, close the processor, turn on water valve and main power. (* 9)

CRITERION-REFERENCED MEASURE:

The student must open processor, drain chemicals, replace worn parts, clean dirty parts, replace chemicals without contamination, reassemble processor, and verify quality control of processor.

PERFORMANCE GUIDE:

1. Turn processor off.
2. Open processor.
3. Drain chemicals.
4. Remove all racks and identify according to position.
5. Check for worn parts and replace if possible.
   NOTE: Report any worn parts that cannot be replaced to the appropriate person.
6. Clean parts with water and nonabrasive pads.
7. Refill fixer tank with fixer solution.
8. Refill developer tank with developer solution.
   NOTE: Add starter, according to manufacturer's recommendations.
9. Replace racks in tank.

PERFORMANCE GUIDE: (cont.)

10. Replace processor top.
11. Turn on processor.
    NOTE: Wait to run test film until desired temperature is reached.
12. Run a test film and inspect for contamination and image quality.
    NOTE: If image quality on test films is not acceptable, repeat steps 1-12.

CHECKLIST

DUTY Performing Support Services

TASK Clean film processing equipment.

ENABLER

1. Identify type of film processing equipment to be cleaned.
2. Turn processor off and open processor so parts to be cleaned are accessable.
3. Locate and read film processor's cleaning guidelines as set forth by manufacturer.

STUDENT'S NAME____________________________ **DATE**__________

EVALUATOR'S NAME__________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to clean film processing equipment.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Turned processor off.		
2.	Opened processor.		
3.	Drained chemicals.		
4.	Removed all racks and identified according to position.		
5.	Checked for worn parts and replaced if possible.		
6.	Cleaned parts with water and nonabrasive pads.		
7.	Refilled fixer tank with fixer solution.		
8.	Refilled developer tank with developer solution.		
9.	Replaced racks in tank.		
10.	Replaced processor top.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
11.	Turned on processor.		
12.	Ran a test film and inspected for contamination and image quality.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 99

TASK: Prepare film holders.

STANDARD OF PERFORMANCE OF TASK:

The film must be secured in the film cassette and must not be fogged.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Film holder
X-ray film
Film bin
Darkroom
Safelight illuminator

ENABLING OBJECTIVES:

1. Identify type of radiographic film to be placed in holders.
2. Identify type of film holder to be prepared.
3. Review established department procedure for preparing film holders.

***RESOURCES:**

1. Department policy/procedure manual.
2. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
3. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Thompson, T. (1980). A practical approach to modern imaging equipment (2nd ed.). Boston, MA: Little, Brown and Company.
5. Darkroom.
6. Radiographic film holders/cassettes.
7. Radiographic film.
8. Manufacturer's instructions for film holder.
9. Checklist - Preparing film holders.

TEACHING ACTIVITIES:

1. Review darkroom operating procedures. (* 1,2,3,4 & 5)
2. Review procedure for testing darkroom for white light leaks. (* 1,2,3,4 & 5)
3. Demonstrate darkroom operating and testing procedure. (* 5)
4. Explain the function of safelight illuminators and their operation. (* 1 & 5)
5. Show students how to operate the safelight illuminator. (* 5)
6. Discuss the function of a film bin and review the types and sizes of film it contains. (* 5)
7. Show students how to operate the film bin and select the proper film. (* 5 & 7)
8. Explain how to open film holder and position film in holder. (* 6,7 & 8)
9. Demonstrate how to open film holder and position film in holder. (* 6,7 & 8)
10. Demonstrate procedure for closing and locking the film holder. (* 6,7 & 8)
11. Explain the importance of verifying that the film holder is locked shut and that none of the film is hanging out. (* 1)
12. Discuss the storage of prepared film holders in required storage areas, such as pass box or cabinets according to holder size. (* 1)
13. Show students how to store prepared holders. (* 1)
14. Monitor students practicing preparing film holders. (* 5,6 & 7)
15. Assign students to prepare a film holder. (* 9)

CRITERION-REFERENCED MEASURE:

The student must check the darkroom for white light leaks, utilize safelight illuminator, open film holder, select and secure film in film holder, close and lock film holder and return film holder to storage area.

PERFORMANCE GUIDE:

1. Close darkroom door, turn white light off.
2. Check for white light leaks.
3. Turn on safelight illuminator and open film holder.
4. Open film bin and select film.
5. Close film bin.
6. Place film in film holder.
7. Close film holder.
8. Return film holder to storage area.

CHECKLIST

DUTY Performing Support Services

TASK Prepare film holders.

ENABLER

1. Identify type of radiographic film to be placed in holders.
2. Identify type of film holder to be prepared.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare film holders.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Closed darkroom door, turned white light off.		
2.	Checked for white light leaks.		
3.	Turned on safelight illuminator and opened film holder.		
4.	Opened film bin and selected film.		
5.	Closed film bin.		
6.	Placed film in film holder.		
7.	Closed film holder.		
8.	Returned film holder to storage area.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 100

TASK: Perform safelight test.

STANDARD OF PERFORMANCE OF TASK:

The safelight test must determine whether the safelight is fogging the radiographic film.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Film cassette
Radiographic film
X-ray machine
Film processor
Dark room

ENABLING OBJECTIVES:

1. Load two cassettes with the same type of film.
2. Review established department procedure for performing safelight test.

***RESOURCES:**

1. Department policy/procedure manual.
2. Armstrong, P., & Wastie, M. (1986). Diagnostic imaging. Boston, MA: Blackwell Scientific Publications Ltd.
3. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
4. Darkroom.
5. Safelight illuminator.
6. Film holders.
7. Film processor.
8. Radiographic unit.
9. Checklist - Performing safelight test.

TEACHING ACTIVITIES:

1. Discuss the positioning and exposure which is given to each cassette, stressing the importance that both receive exactly the same exposure and positioning. (* 1,2 & 3)

TEACHING ACTIVITIES: (cont.)

2. Demonstrate how to position and expose cassettes. (* 6 & 8)
3. Explain procedure for removing film from one holder with safelight illuminator off. (* 1,2 & 3)
4. Explain procedure for removing film from the other holder with safelight illuminator off. (* 1,2 & 3)
5. Demonstrate procedure for removing films from holders during a safelight test. (* 4,5 & 6)
6. Review methods of processing exposed films. (* 2,3 & 7)
7. Discuss method for comparing exposed films density for signs of safelight failure. (* 1,2 & 3)
8. Monitor students practicing performing a safelight test. (* 4,5,6,7 & 8)
9. Assign students to perform a safelight test. (* 9)

CRITERION-REFERENCED MEASURE:

The student must expose two loaded cassettes to the same x-ray exposure, remove one film under safelight condition, remove other film without safelight, process films and compare films for white light leaks.

PERFORMANCE GUIDE:

1. Select two cassettes loaded with film.
2. Expose each to a very small x-ray exposure. (About 1.0 MaS, 60 kv, 40" FFD).
   NOTE: Both cassettes must receive exactly the same exposure.
3. Remove the film from one cassette under conditions that normally exist in the darkroom and process the film.
4. Turn off safelight(s) and remove the film from the remaining cassette.
   NOTE: This step must be accomplished in total darkness.
5. Process film.
6. Compare the film for differences in density.

CHECKLIST

DUTY Performing Support Services

TASK Perform safelight test.

ENABLER

1. Load two cassettes with the same type of film.

STUDENT'S NAME ________________________ **DATE** __________

EVALUATOR'S NAME ________________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform safelight test.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Selected two cassettes loaded with film.	______	______
2. Exposed each to a very small x-ray exposure. (About 1.0 MaS, 60 kv, 40" FFD).	______	______
3. Removed the film from one cassette under conditions that normally exist in the darkroom and processed the film.	______	______
4. Turned off safelight(s) and removed the film from the remaining cassette.	______	______
5. Processed film.	______	______
6. Compared the film for differences in density.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 101

TASK: Process x-ray film manually.

STANDARD OF PERFORMANCE OF TASK:

Radiographic films must be developed according to film manufacturer's suggested manual technique. Developing steps must be followed in exact sequence.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Darkroom
Safelight
Film hanger
Timer
Fixer
Water
Developer
Corner cutter
Film identification equipment
Cassette containing undeveloped radiograph

ENABLING OBJECTIVES:

1. Identify x-ray film to be processed manually.
2. Identify type of x-ray film to be processed and manufacturer's suggested guidelines.
3. Review established department procedure for processing x-ray film manually.

***RESOURCES:**

1. Department policy/procedure manual.
2. Cusworth, Rita. (1983). Quality assurance in diagnostic radiology: An eight-step methodology (lesson 1-3). St. Louis, MO: C.V. Mosby Company.
3. Phillips, M. (1987). Ensuring image quality. St. Louis, MO: C.V. Mosby Company.
4. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Darkroom and developing equipment.

***RESOURCES:** (cont.)

6. Developing chemicals.
7. Exposed radiographs.
8. Manufacturer's film developing guidelines.
9. Manufacturer's film specifications.
10. Checklist - Processing film manually.

TEACHING ACTIVITIES:

1. Review darkroom operation procedures including door security, safelight operation, chemical and equipment preparation and film removal and handling. (* 1,2,3,4,8 & 9)
2. Demonstrate darkroom operating procedures. (* 5)
3. Discuss film identification devices and their operation. (* 1,2,3 & 4)
4. Show students how to flash film with patient identification. (* 1 & 5)
5. Explain the operation of film hangers. (* 5)
6. Show students how to hang film on hanger. (* 5 & 6)
7. Discuss chemicals and times needed to develop different types of x-ray film. (* 8 & 9)
8. Explain procedure for hand developing x-ray film. (* 1,2,3,4,8 & 9)
9. Demonstrate operation of timer and stress importance of following the film manufacturer's guidelines for time in chemicals precisely. (* 1,8 & 9)
10. Demonstrate procedure or submerging film on holder into developer container and agitating film for manufacturer's suggested time period. (* 5,6,7,8 & 9)
11. Demonstrate how to remove film from developer and place film in water bath, agitate film, remove film from water bath and let drain into water tank. (* 5,6,7,8 & 9)
12. Show students how to submerge film into fixer container for manufacturer's suggested time period and turn on overhead lights. (* 5,6,7,8 & 9)
13. Show students how to remove film from fixer and let excess fixer drip into fixer tank. (* 5 & 7)
14. Demonstrate how to hang film to air dry. (* 5 & 7)
15. Review procedure for placing processed film on view box/illuminator and checking film for artifacts. (* 1,2,3 & 4)
16. Discuss possible causes of artifacts such as incorrect temperature, chemicals, length of developing or fixing, etc. (* 2,3 & 4)

PERFORMING GUIDE (cont.)

2. Determine type of ultrasound to be performed: (cont.)
   D. Display systems:
      1. Scanning arm and position monitor.
      2. Oscilloscope.
      3. Storage oscilloscope.
      4. T.V. monitor.
      5. Scan convertor.
      6. Real-time display.
      7. Doppler display.
      8. Character generator.

CHECKLIST

DUTY Performing Support Services

TASK Identify ultrasound equipment limitations.

ENABLER

1. Recall types of ultrasound equipment.
2. Recall types of ultrasound examinations.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to identify ultrasound equipment limitations.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained list of examination to be performed.	______	______
2.	Determined type of ultrasound to be performed.	______	______
3.	Identified ultrasound equipment.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 112

TASK: Perform radiographic equipment test and calibration check.

STANDARD OF PERFORMANCE OF TASK:

Examination/therapeutic equipment must be tested and calibrated according to federal, state, or hospital regulations and guidelines.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Phantom
Test object
Reference standards
Radiologic examination/therapeutic equipment

ENABLING OBJECTIVES:

1. Identify radiographic equipment which is tested and calibrated.
2. Recall federal, state and local guidelines for radiologic calibration.
3. Locate test items and reference standards.
4. Review established department policy/procedure for performing radiographic equipment tests and calibrations.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Athey, P., & McClendon, L. (1984). Diagnostic ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
5. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES:** (cont.)

6. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
7. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
8. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
9. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
10. Test objects/reference standards.
11. Radiologic equipment.
12. Checklist - Performing radiologic equipment tests and calibration.

TEACHING ACTIVITIES:

1. Discuss and demonstrate how to determine the type of radiographic examination/therapeutic equipment and the most frequently used parameters for ultrasound. (* 1,4,5,9 & 10)
2. Explain and show students how to determine the type of radiographic examination/therapeutic equipment and the most frequently used parameters for radiation therapy. (* 1,8,9 & 10)
3. Instruct and demonstrate how to determine type of radiographic equipment and the most frequently used parameters for nuclear medicine. (* 1,2,3,9 & 10)
4. Discuss and show students how to determine type of radiographic equipment and the most frequently used parameters for radiography. (* 1,6,7,9 & 10)
5. Identify and demonstrate how to conduct equipment tests. (* 10 & 11)
6. Discuss and show students how to analyze test results. (* 1,7 & 9)
7. Explain and demonstrate how to calibrate equipment based on established procedures and regulations. (* 1,7,9,10 & 11)
8. Review procedure to reporting irregularities or equipment outside of calibration limits to supervisor or radiation officer. (* 1)
9. Monitor students as they practice performing radiographic equipment tests and calibration checks. (* 10 & 11)
10. Supervise and evaluate students performing radiographic equipment test and calibration checks. (* 12)

CRITERION-REFERENCED MEASURE:

The student must identify the type of radiologic equipment to be tested, identify the most frequently used test parameters/objects, conduct equipment test/calibration and report irregularities to supervisor or radiation officer.

PERFORMANCE GUIDE:

1. Determine the type of radiographic examination/therapeutic equipment and the most frequently tested parameters.
2. Identify ultrasound parameters:
   A. A-mode:
      1. Spike deflection from baseline.
      2. "Scale marker" spike height.
      3. "Main bang" spike height.
      4. Echo strength or amplitude.
   B. B-mode:
      1. System sensitivity.
      2. Axial resolution.
      3. Lateral resolution.
      4. Horizontal and vertical marker spacing.
      5. Scanning arm registration.
   C. M-mode:
      1. System sensitivity.
      2. Accuracy and linearity of distance markers.
      3. Axial resolution.
      4. Accuracy and linearity of time markers.
3. Identify radiation therapy parameters:
   A. Simulation machine:
      1. Laser marker alignment.
      2. Grid pattern alignment.
      3. Simulation block alignment.
      4. Treatment head distance.
      5. Radiograph quality.
      6. Treatment portal alignment.
   B. Treatment machine:
      1. Treatment portal alignment.
      2. Grid pattern alignment.
      3. Administered radiation dosage.
      4. Radiation source containment.
      5. Treatment head distance.
      6. Comp filter effectiveness.
      7. Radiation protection booth/devices.
4. Identify nuclear medicine parameters:
   A. Dose calibratior:
      1. Radionuclide standard accuracy.
      2. Tc99m linearity.
      3. Calibrated standard.
      4. Geometric variation.

PERFORMANCE GUIDE: (cont.)

4. Identify nuclear medicine parameters: (cont.)
   B. Scintillation camera:
      1. Extrinsic uniformity.
      2. Extrinsic resolution.
      3. Intrinsic uniformity.
      4. Intrinsic resolution.
5. Identify radiography parameters:
   A. X-ray unit:
      1. Focal spot size.
      2. Spin top test.
      3. Collimator.
      4. Radiation source containment.
      5. Radiation exposure time and dosage.
      6. Radiation protection booth/devices.
6. Conduct equipment test.
7. Analyze test results.
8. Calibrate equipment based on test results following established federal, state, or hospital procedures and regulations.
9. Report irregularities or equipment outside of calibration limits to supervisor or radiation officer immediately.

CHECKLIST

DUTY Performing Support Services

TASK Perform radiographic equipment test and calibration check.

ENABLER

1. Identify radiographic equipment which is to be tested and calibrated.
2. Recall federal, state and local guidelines for radiologic calibration.
3. Locate test items and reference standards.

STUDENT'S NAME______________________________ **DATE**____________

EVALUATOR'S NAME______________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform radiographic equipment test and calibration check.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Determined the type of radiographic examination/therapeutic equipment.		
2.	Determined most frequently tested parameters.		
3.	Conducted equipment test.		
4.	Analyzed test results.		
5.	Calibrated equipment based on test results following established federal, state, or hospital procedures and regulations.		
6.	Reported irregularities or equipment outside of calibration limits to supervisor or radiation officer immediately.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 113

TASK: Conduct scanner operational check.

STANDARD OF PERFORMANCE OF TASK:

The electronic calculator in the position monitor must solve trigonometric equations using the length of the scanner arms and the angulation of the joint potentiometers to calculate the position and orientation of the transducer required to maintain the orientation of the echo dots. The two-dimensional picture produced by the test scanner must match the two-dimensional picture produced by the reference scanner. Measurements and parameters must match those established for the test object or phantom being used.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Scanner to be tested
Reference scanner
Test object or phantom

ENABLING OBJECTIVES:

1. Locate test object or phantom to be used.
2. Identify scanner operation procedures.
3. Review established department procedure for conducting scanner operational check.

***RESOURCES:**

1. Department policy/procedure manual.
2. Athey, P., & McClendon, L. (1984). Diagnostic ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
3. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES:** (cont.)

5. Scanner (to be tested).
6. Scanner (to be referenced).
7. Test object or phantom.
8. Checklist - Conducting scanner operational check.

TEACHING ACTIVITIES:

1. Explain to students how to obtain reference scanner, test object or phantom. (* 2,3, & 4)
2. Explain and demonstrate how to conduct scanner operational check using test object or phantom. (* 2,3,4,5,6 & 7)
3. Explain and demonstrate how to conduct scanner operational check using reference scanner. (* 1,2,3, & 4)
4. Instruct and show students how to calibrate scanner assembly to compensate for variations. (* 1,2,3,4 & 5)
5. Review procedure to notify supervisor of variations outside of calibration limitations. (* 1)
6. Monitor students as they practice conducting scanner operational check. (* 5,6 & 7)
7. Supervise and evaluate students conducting scanner operational check. (* 8)

CRITERION-REFERENCED MEASURE:

The student must select a reference scanner, test object or phantom to be used, conduct scanner check, calibrate scanner and notify supervisor of scanners outside acceptable limits.

PERFORMANCE GUIDE:

1. Obtain reference scanner, test object or phantom.
2. Determine method of scanner check.
   A. Test object or phantom:
      1. Position test object or phantom to be scanned.
      2. Scan the test object.
      3. Compare the display pattern results to the test item/phantom's established display pattern.
         NOTE: Variations in measurements and parameters can be attributed to the equipment, since the "patient" (test object or phantom) and scanning procedures are standardized.

PERFORMANCE GUIDE: (cont.)

2. Determine method of scanner check. (cont.)
   - B. Reference scanner:
     1. Conduct scan of object using reference scanner having known acceptable measurements and parameters.
     2. Record reference scan results.
     3. Conduct scan of same object using test scanner.
     4. Record test scan results.
     5. Compare test scan results to reference scan results.
3. Calibrate scanner assembly to compensate for variations.
4. Notify supervisor of variations outside of calibration limitations.

CHECKLIST

DUTY Performing Support Services

TASK Conduct scanner operational check.

ENABLER

1. Locate test object or phantom to be used.
2. Recall scanner operation procedures.

STUDENT'S NAME ________________________ **DATE** __________

EVALUATOR'S NAME ________________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct scanner operational check.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained reference scanner, test object or phantom.		
2.	Determined method of scanner check.		
3.	Tested object or phantom:		
	- Positioned test object or phantom to be scanned.		
	- Scanned the test object.		
	- Compared the display pattern results to the test item/phantom's established display pattern.		
4.	Tested reference scanner:		
	- Conducted scan of object using reference scanner having known acceptable measurements and parameters.		
	- Recorded reference scan results.		
	- Conducted scan of same object using test scanner.		
	- Recorded test scan results.		

PERFORMANCE DETERMINANTS (cont.)	**YES**	**NO**
4. Tested reference scanner: (cont.)		
- Compared test scan results to reference scan results.	________	________
5. Calibrated scanner assembly to compensate for variations.	________	________
6. Notified supervisor of variations outside of calibration limitations.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 114

TASK: Position scanning arm/transducer.

STANDARD OF PERFORMANCE OF TASK:

The scanning arm/transducer must be positioned according to scan plane, scan viewing orientation, reference plane coordinates, transducer scanning motion and sources of possible artifacts.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's request
Patient to be tested
Scanning arm/transducer
Examination table
Coupling media
Patient's chart/medical history

ENABLING OBJECTIVES:

1. Recall how to operate scan arm/transducer.
2. Identify area to be scanned.
3. Verify physician's request for ultrasound scan.
4. Review established department procedure for positioning scanning arm/transducer.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Athey, P., & Hadlock, F. (1985). Ultrasound in obstetrics and gynecology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.
5. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.

***RESOURCES** (cont.)

6. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Physician's request.
8. Scanning arm/transducer.
9. Checklist - Positioning scanning arm/transducer.

TEACHING ACTIVITIES:

1. Explain and show students how to determine type and area of scan. (* 1,2 & 7)
2. Explain and demonstrate how to determine requested scan plane. (* 3,4,5 & 6)
3. Discuss and show students how to establish scan viewing orientation. (* 3,4,5 & 6)
4. Review and demonstrate how to identify reference plane coordinate system. (* 3,4,5 & 6)
5. Explain and demonstrate how to determine scanning motion. (* 2,3,4,5 & 6)
6. Conduct class discussion on possible sources of noise and reverberation artifacts. (* 3,4,5 & 6)
7. Explain and show how to compensate for any known or suspected adverse conditions while positioning transducer. (* 2,3,4,5,6 & 8)
8. Monitor students as they practice positioning scanning arm/transducer. (* 7 & 8)
9. Supervise and evaluate students positioning scanning arm/transducer. (* 9)

CRITERION-REFERENCED MEASURE:

The student must identify type of scan to be made, locate requested scan plan, determine scan viewing orientation, identify reference plane coordinates, determine scanning motion, identify sources of artifacts, and compensate for known or suspected adverse conditions.

PERFORMANCE GUIDE:

1. Determine type and area of scan.
2. Determine requested scan plane:
   A. Transverse scan plane.
   B. Longitudinal scan plane.
3. Establish scan viewing orientation:
   A. Supine transverse.
   B. Prone transverse.
   C. Supine longitudinal.
   D. Prone longitudinal.

PERFORMANCE GUIDE: (cont.)

4. Identify reference plane coordinate system:
   - A. + or - cm coordinates.
   - B. R or L, + or - cm coordinates.
   - C. A, B, C plane coordinates.
5. Determine scanning motion to be used:
   - A. Sector scanning.
   - B. Simple scanning.
   - C. Compound scanning.
   - D. Real time.
6. Identify possible sources of artifacts:
   - A. Noise artifacts:
     1. Electrical components.
     2. Outside electrical interference.
   - B. Reverberation artifacts:
     1. Acoustic impedance.
        - a. Transducer/coupling media interface.
        - b. High gain pulse.

CHECKLIST

DUTY Performing Support Services

TASK Position scanning arm/transducer.

ENABLER

1. Recall how to operate scan arm transducer.
2. Identify area to be scanned.
3. Verify physician's request for ultrasound scan.

STUDENT'S NAME________________________ **DATE**__________

EVALUATOR'S NAME________________________ **COURSE**_________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to position scanning arm/transducer.

PERFORMANCE DETERMINANTS	YES	NO
1. Determined type and area of scan.	______	______
2. Determined requested scan plane:		
- Transverse scan plane.	______	______
- Longitudinal scan plane.	______	______
3. Established scan viewing orientation:		
- Supine transverse.	______	______
- Prone transverse.	______	______
- Supine longitudinal.	______	______
- Prone longitudinal.	______	______
4. Identified reference plane coordinate system:		
- + or - cm coordinates.	______	______
- R or L, + or - cm coordinates.	______	______
- A, B, C plane coordinates.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
5. Determined scanning motion to be used:		
- Sector scanning.		
- Simple scanning.		
- Compound scanning.		
- Real time.		
6. Identified possible sources of artifacts.		
7. Compensated for any known or suspected adverse conditions while positioning transducer.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 115

TASK: Record test results using a hard copy method.

STANDARD OF PERFORMANCE OF TASK:

The hard copy scan record must show the exact sonographic transitory image displayed on the CRT oscilloscope or TV monitor and provide a permanent record (hard copy) of the scan results.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

View box
X-ray processor
Scan results on display system
Ancillary recording devices
Recording media (film, tapes, charts)

ENABLING OBJECTIVES:

1. List types of hard copy equipment.
2. Identify ancillary recording device to be used.
3. Locate hard copy recording media.
4. Review established department policy/procedure manual.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Athey, P., & Hadlock, F. (1985). Ultrasound in obstetrics and gynecology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Athey, P., & McClendon, L. (1984). Diagnostic Ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
5. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

6. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Ultrasound scan results.
8. Ancillary recording device.
9. Recording media.
10. Checklist - Recording test results on hard copy.

TEACHING ACTIVITIES:

1. Explain and show students how to obtain desired sonographic transitory image on display screen. (* 4,5,6 & 7)
2. Demonstrate and explain how to adjust display screen to obtain optimum image. (* 1,2,4,5 & 6)
3. Conduct class discussion on different types of hard copy methods. (* 1,2 & 3)
4. Review and show how to make a hard copy method. (* 3,4,5,8 & 9)
5. Demonstrate how to obtain hard copy record and compare hard copy record to transitory image for accuracy. (* 1,2 & 4)
6. Stress to students to always compare the hard copy to the transitory screen image before erasing the screen for the next scan. (* 1)
7. Review and show students how to label the hard copy record according to department procedures. (* 2,3,4,5 & 6)
8. Review proper procedure for storing/filing hard copy records in appropriate storage case or file cabinet. (* 1)
9. Monitor students as they practice recording test results using a hard copy method. (* 7,8 & 9)
10. Supervise and evaluate students recording test results using a hard copy method. (* 10)

CRITERION-REFERENCED MEASURE:

The student must obtain sonographic transitory image on screen display, adjust screen, make a hard copy of test results, compare hard copy to transitory image, put identification labels on the hard copy record and store/file hard copy record.

PERFORMANCE GUIDE:

1. Obtain desired sonographic transitory image on display screen.

PERFORMANCE GUIDE: (cont.)

2. Adjust display screen to obtain optimum image.
3. Determine appropriate hard copy method:
   - A. Photograph:
     1. Polaroid camera.
     2. 8 X 10 single emulsion camera.
   - B. Video tape:
     1. Video cassette camera.
     2. Video cassette recorder.
   - C. Audio tape:
     1. Audio cassette recorder.
   - D. Paper print-out:
     1. Strip-chart recorder.
4. Obtain hard copy record.
5. Compare hard copy record to transitory image for accuracy.

   NOTE: If hard copy image does not match the transitory screen image then repeat steps 4 and 5.

   CAUTION: Always compare the hard copy image to the transitory screen image before erasing the screen for the next scan.
6. Label the hard copy record:
   - A. Patient name.
   - B. Patient identification number.
   - C. Type of test.
   - D. Date of test.
   - E. Notes or points of interest.
7. Store/file hard copy record in appropriate storage case or file cabinet.

CHECKLIST

DUTY Performing Support Services

TASK Record test results using hard copy method.

ENABLER

1. Recall types of hard copy equipment.
2. Identify ancillary recording device to be used.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to record test results using hard copy method.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Obtained desired sonographic transitory image on display screen.		
2.	Adjusted display screen to obtain optimum image.		
3.	Determined appropriate hard copy method.		
4.	Obtained hard copy record.		
5.	Compared hard copy record to transitory image for accuracy.		
6.	Labeled the hard copy record:		
	- Patient name.		
	- Patient identification number.		
	- Type of test.		
	- Date of test.		
	- Notes or points of interest.		
7.	Stored/filed hard copy record in appropriate storage case or file cabinet.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 116

TASK: Conduct accuracy test of test recording equipment.

STANDARD OF PERFORMANCE OF TASK:

Recorded test results "hard copy" must reproduce the transitory image exactly as seen on the display system.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Display system
Recording media
Ancillary recording device

ENABLING OBJECTIVES:

1. Locate ancillary recording device.
2. Locate recording equipment and supplies.
3. Review established department procedure for conducting an accuracy test of recording equipment.

***RESOURCES:**

1. Department policy/procedure manual.
2. Athey, P., & McClendon, L. (1984). Diagnostic Ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
3. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Cusworth, R. (1983). Quality assurance in diagnostic radiology: An eight-step methodology (lesson 1-3). St. Louis, MO: C.V. Mosby Company.
6. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Ancillary recording device.
8. Recording media.

***RESOURCES:** (cont.)

9. Display system.
10. Checklist - Conducting accuracy test.

TEACHING ACTIVITIES:

1. Review and show students how to verify desired sonographic transitory image on screen display system. (* 2,3,4 & 9)
2. Explain and demonstrate how to record test results on ancillary recording device. (* 2,3 & 7)
3. Instruct and demonstrate how to prepare the "hard copy" test results to screen display image for required detail. (* 2,3,4,7 & 8)
4. Discuss and demonstrate how to compare "hard copy" test results to screen display image for required detail. (* 1,5,6,8 & 9)
5. Explain and show students how to adjust recording to obtain desired hard copy. (* 7 & 9)
6. Instruct students to repeat procedure until an accurate hard copy record is achieved. (* 1)
7. Monitor students as they practice conducting accuracy test of test recording equipment. (* 7,8 & 9)
8. Supervise and evaluate students conducting accuracy test of test recording equipment. (* 10)

CRITERION-REFERENCED MEASURE:

The student must obtain desired transitory image on the screen, record image on ancillary recording device, prepare hard copy results, compare hard copy to screen display, adjust recording and store hard copy record for future use.

PERFORMANCE GUIDE:

1. Verify desired sonographic transitory image on screen display system.
2. Record test results on ancillary recording device.
3. Prepare the "hard copy" test results:
   A. Camera:
      1. Develop film.
   B. Recorder:
      1. Rewind tape.
4. Compare "hard copy" test results to screen display image for required detail.

PERFORMANCE GUIDE: (cont.)

5. Adjust recording to obtain desired hard copy:
    - A. Part detail.
    - B. Shading/contrast.
    - C. Details of important interest to physician.
    - D. Sharpness of image.
6. Repeat step 2-5 until an accurate hard copy record is achieved.

    NOTE: If recording device can not be adjusted to provide an accurate hard copy record, then report equipment malfunction to supervisor and use an alternate recording device to produce hard copy record.

    CAUTION: Never turn off or erase test results from the ultrasound testing equipment until an accurate hard copy record has been obtained. Once erased, test results can not be retrieved without repeating the entire ultrasound scan.

CHECKLIST

DUTY Performing Support Services

TASK Conduct accuracy test of test recording equipment.

ENABLER

1. Locate ancillary recording device.
2. Locate recording equipment and supplies.

STUDENT'S NAME ______________________________ **DATE** __________

EVALUATOR'S NAME ____________________________ **COURSE** ________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct accuracy test of test recording equipment.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Verified desired sonographic transitory image on screen display system.		
2.	Recorded test results on ancillary recording device.		
3.	Prepared the "hard copy" test results.		
4.	Compared "hard copy" test results to screen display image for required detail.		
5.	Adjusted recording to obtain desired hard copy.		
6.	Repeated steps 2-5 until an accurate hard copy record was achieved.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 117

TASK: Prepare sterile examining device.

STANDARD OF PERFORMANCE OF TASK:

Necessary accessory items must be sterile and attached/placed on the examining device using aseptic techniques. The prepared examining device must be ready to perform indicated examination and be free of pathogenic microorganisms and foreign objects.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Disinfectant
Clean cloth/sponge
Sterile accessory items
Sterile accessory attachments

ENABLING OBJECTIVES:

1. Identify examination requested by physician.
2. Identify accessory items needed.
3. Review established department procedure for preparing sterile examining device.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
5. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
6. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

7. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
8. Athey, P., & McClendon, L. (1984). Diagnostic Ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
9. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
10. Cleaning materials.
11. Sterile accessory items/attachments.
12. Examining device.
13. Checklist - Preparing sterile examining device.

TEACHING ACTIVITIES:

1. Conduct class discussion on accessory attachments/items needed for examinations. (* 1,2,4,7 & 9)
2. Show students how to assemble needed accessory attachments/items. (* 1 & 11)
3. Review hospital procedure regarding disinfecting permanent fixtures on the examining device. (* 1 & 11)
4. Demonstrate how to disinfect permanent fixtures on the examining device. (* 3,5,6,8,10 & 12)
5. Explain and show students how to attach sterile accessories using aseptic techniques. (* 2,5,7,9 & 11)
6. Demonstrate how to place sterile items such as sheets, covers, pillow and linens on examining device using aseptic technique. (* 11 & 12)
7. Discuss the removal of objects not pertinent to the examination. (* 1)
8. Review hospital guidelines on maintaining sterile examining device/field. (* 1,2 & 4)
9. Monitor students as they practice preparing sterile examining device. (* 10,11 & 12)
10. Supervise and evaluate students preparing sterile examining device. (* 13)

CRITERION-REFERENCED MEASURE:

The student must gather needed accessory items, disinfect permanent fixtures on examining device, attach sterile accessories, remove any objects not pertinent to the examination and maintain a sterile examining device and field.

PERFORMANCE GUIDE:

1. Check physician's request for examination to be performed.
2. Assemble needed accessory attachments/items.
3. Disinfect all permanent fixtures on the examining device according to hospital's established procedures.
4. Attach sterile accessories using aseptic techniques.
5. Place sterile items such as sheets, covers, pillow and linens on examining device using aseptic techniques.
6. Remove objects not pertinent to the examination performance from the examination device and examination area.
7. Maintain sterile examining device/field according to established hospital guidelines.

CHECKLIST

DUTY Performing Support Services

TASK Prepare sterile examining device.

ENABLER

1. Identify examination requested by physician.
2. Identify accessory items needed.

STUDENT'S NAME________________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare sterile examining device.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Checked physician's request for examination to be performed.		
2.	Assembled needed accessory attachments/items.		
3.	Disinfected all permanent fixtures on the examining device according to hospital's established procedures.		
4.	Attached sterile accessories using aseptic techniques.		
5.	Placed sterile items such as sheets, covers, pillow and linens on examining device using aseptic techniques.		
6.	Removed objects not pertinent to the examination performance from the examination device and examination area.		
7.	Maintained sterile examining device/field according to established hospital guidelines.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 118

TASK: Elute generator.

STANDARD OF PERFORMANCE OF TASK:

The sterility of the system must be maintained and radiation exposure must be kept as low as reasonably achievable according to ALARA standards.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Diagnostic Ultrasound for Radiographers.

CONDITIONS FOR PERFORMANCE OF TASK:

Swabs
Generator
Elution vials
Collecting vials
Protective shielding
Protective clothing
Germicidal solution

ENABLING OBJECTIVES:

1. Identify generator to be eluted.
2. Recall radiation protection measures.
3. Assemble equipment needed to elute the generator.
4. Review established department policy/procedure manual.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
5. Hoffer, P., & Associate Editors. (1986). 1986 Yearbook of nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES:** (cont.)

6. Elutant vials.
7. Collecting vials.
8. Protective shielding and clothing.
9. Gemicidal solution.
10. Generator.
11. Checklist - Eluting a generator.

TEACHING ACTIVITIES:

1. Explain and show students how to remove port plugs from shield. (* 10)
2. Instruct and demonstrate how to swab rubber closures of evacuated collection vials with germicide. (* 2,3,4,5 & 10)
3. Demonstrate how to position eluant vial when present. (* 2,3,4,5 & 6)
4. Explain and demonstrate how to place collecting vial in lead shield. (* 2,3,4,5 & 7)
5. Instruct and show students how to insert needle into collecting vial. Stress that needle should puncture center of stopper and that student should wait three to ten minutes to insure complete elution. (* 2,3,4,9 & 10)
6. Demonstrate how to turn elution knobs off. (* 10)
7. Explain and demonstrate how to remove shielded collecting vial and install leaded glass container or insert lead cap after elution. (* 2,3,4 & 5)
8. Instruct and demonstrate how to install needle cover immediately after removing collecting vial. (* 1,2,3,4 & 5)
9. Review proper disposal method for needles. (* 2,3,4 & 5)
10. Review procedure and show how to label evacuated vial with appropriate markings. (* 2 & 3)
11. Identify storage location and instruct students to place vial in acceptable storage location until use. (* 1)
12. Monitor students as they practice eluting a generator. (* 7,8,9 & 10)
13. Supervise and evaluate students eluting generator. (* 11)

CRITERION-REFERENCED MEASURE:

The student must position collecting vials, remove elutants from generator, shield the vials, label evacuated vial, and store for future use.

PERFORMANCE GUIDE:

1. Remove port plugs from shield.
2. Swab rubber closures of evacuated collection vials with germicide.
3. Position elution vial when present.
4. Place collecting vial in lead shield.
5. Insert needle into collecting vial, insure needle punctures at center of stopper, wait three minutes to ten minutes to insure complete elution.
6. Turn elution knobs off.
7. Remove shielded collecting vial and install leaded glass container or insert lead cap, after elution.
8. Install needle cover immediately after removing collecting vial. Remove the needles and place in acceptable disposable container.
   NOTE: Some generators have permanent needles. Protective vials are removed and replaced.
9. Label evacuated vial with appropriate markings.
10. Place in acceptable storage location until use.

CHECKLIST

DUTY Performing Support Services

TASK Elute generator.

ENABLER

1. Identify generator to be eluted.
2. Recall radiation protection measures.
3. Assemble equipment needed to elute the generator.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to elute generator.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Removed port plugs from shield.	______	______
2.	Swabbed rubber closures of evacuated collection vials with germicide.	______	______
3.	Positioned elution vial when present.	______	______
4.	Placed collecting vial in lead shield.	______	______
5.	Inserted needle into collecting vial, insured needle punctures at center of stopper, waited three minutes to ten minutes to insure complete elution.	______	______
6.	Turned elution knobs off.	______	______
7.	Removed shielded collecting vial and installed leaded glass container or inserted lead cap, after elution.	______	______
8.	Installed needle cover immediately after removing collecting vial.	______	______
9.	Removed the needles and placed in acceptable disposable container.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Labeled evacuated vial with appropriate markings.	________	________
11. Placed vial in acceptable storage location until use.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 119

TASK: Perform Mo99 breakthrough test on elution.

STANDARD OF PERFORMANCE OF TASK:

No elution shall contain Mo99.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Tc99m elution
Protective shielding
Long forceps
Leaded glass work area
Assay recording form
Dose calibrator
Multichannel analyzer

ENABLING OBJECTIVES:

1. Locate shielded Mo99 assay material.
2. Locate pre-calibrate dose calibrator.
3. Locat multichannel analyzer.
4. Review established department procedure for performing Mo99 breakthrough test.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
5. Cusworth, R. (1983). Quality assurance in diagnostic radiology: An eight-step methodology (lesson 1-3). St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

6. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Tc99m elution.
8. Protective shielding.
9. Dose calibrator.
10. Multichannel analyzer.
11. Assay recording form.
12. Checklist - Performing Mo99m breakthrough test.

TEACHING ACTIVITIES:

1. Explain and demonstrate how to analyze elution using a dose calibrator. (* 2,3,6,7,8 & 9)
2. Explain and demonstrate how to analyze elution using a multichannel analyzer. (* 2,3,6,7,8 & 10)
3. Review and show students how to interpret Mo99 breakthrough test results. (* 2,3,4,5,6 & 8)
4. Instruct students to repeat analysis if Mo99 is detected in elution. (* 1)
5. Review and show students how to notify supervisor/manufacturer if reading still detects Mo99 breakthrough. (* 1)
6. Monitor students as they practice performing Mo99 breakthrough test on elution. (* 7,8,9,10 & 11)
7. Supervise and evaluate students performing Mo99 breakthrough tests on elution. (* 12)

CRITERION-REFERENCED MEASURE:

The student must obtain the Tc99m elution, analyze the elution, interpret Mo99 test results, repeat procedure if Mo99m is found and notify supervisor/manufacturers of errors found.

PERFORMANCE GUIDE:

1. Obtain elution to be analyzed.
2. Analyze elution:
   A. Using a Dose Calibrator:
      1. Select activity range.
      2. Set background control to zero.
      3. Insert elution vial into shielded Mo99 assay holder.
      4. Lower assembly into chamber.
      5. Read Mo99 activity.
      6. Record activity on prescribed form or document.
      7. Remove holder assembly from chamber.
      8. Remove elution vial from holder.

PERFORMANCE GUIDE: (cont.)

        9. Insert vial into chamber.
        10. Read Tc99m activity.
        11. Record activity readings.
    B. Using a Multichannel Analyzer:
        1. Assay the elution.
        2. Set baseline to Mo99 energy setting and window.
        3. Count reference standard.
        4. Count Tc99.
        5. Count background radiation.
        6. Check for Mo99 breakthrough.
3. Interpret Mo99 breakthrough test results.
4. Repeat procedure, if Mo99 is detected in the elution.
5. Notify supervisor/manufacturer, if reading still detects Mo99 breakthrough.

CHECKLIST

DUTY Performing Support Services

TASK Perform Mo99 breakthrough test on elution.

ENABLER

1. Locate shielded Mo99 assay material.
2. Locate pre-calibrated dose calibrator.
3. Locate multichannel analyzer.
4. Review established department procedure for performing Mo99 breakthrough test.

STUDENT'S NAME________________________________DATE__________

EVALUATOR'S NAME______________________________COURSE________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform Mo99 breakthrough test on elution.

PERFORMANCE DETERMINANTS	YES	NO
1. Obtained elution to be analyzed.		
2. Analyzed elution using a dose calibrator:		
- Selected activity range.		
- Set background control to zero.		
- Inserted elution vial into shielded Mo99 assay holder.		
- Lowered assembly into chamber.		
- Read Mo99 activity.		
- Recorded activity on prescribed form or document.		
- Removed holder assembly from chamber.		
- Removed elution vial from holder.		

PERFORMANCE DETERMINANTS	YES	NO
2. Analyzed elution using a dose calibrator: (cont.)		
- Inserted vial into chamber.		
- Read Tc99m activity.		
- Recorded activity readings.		
3. Using a Multichannel Analyzer:		
- Assayed the eluate.		
- Set baseline to Mo99 energy setting and window.		
- Counted reference standard.		
- Counted Tc99.		
- Counted background radiation.		
- Checked for Mo99 breakthrough.		
4. Interpreted MO99 breakthrough test results.		
5. Repeated procedure, if MO99 is detected in the elute.		
6. Notified supervisor/manufacturer, if reading still detects MO99 breakthrough.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 120

TASK: Analyze the elution.

STANDARD OF PERFORMANCE OF TASK:

The total activity concentration must be within + or - 5% of the normally eluted activity for that day of the week.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Shielded collecting vial containing generator elution
Precalibrated dose calibrator
Lead glass work area
Long forceps
Protective clothing
Assay recording form

ENABLING OBJECTIVES:

1. Identify elution to be analyzed.
2. List tolerance range for total activity concentration.
3. Locate precalibratd dose calibrator.
4. Review established department policy/procedure for analyzing the elution.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.

TEACHING ACTIVITIES: (cont.)

17. Conduct class discussion stressing the importance of processing film correctly the first time to avoid repeated patient exposure and loss of time. (* 1)
18. Monitor students practicing manual x-ray film processing. (* 5,6,7,8 & 9)
19. Assign students to process x-ray film manually. (* 10)

CRITERION-REFERENCED MEASURE:

The student must prepare the darkroom for film processing, determine manufacturer's suggested guidelines for film processing, process the film manually, and verify film's diagnostic quality.

PERFORMANCE GUIDE:

1. Enter darkroom with cassette containing undeveloped radiograph and turn safelight on.
2. Turn overhead lights off and close door.
3. Open cassette and remove undeveloped film.
4. Flash film with patient identification.
5. Secure film in film hanger.
6. Submerge film in developer for appropriate amount of time.
   NOTE: Refer to manufacturer's guidelines for length of time. It is imperative that the film be agitated, while it is submerged in developer to prevent artifacts on film.
7. Remove film from developer and briefly rinse film in water bath (4-5 sec.). Let majority of water drain from film.
8. Submerge film in fixer for appropriate amount of time.
   NOTE: See manufacturer's guidelines for length of time for different films. Overhead light may be turned on at this point.
9. Remove film from fixer and let majority of fixer drip off film.
10. Rinse film in water for one minute.
11. Remove film from water and hang to air dry.
12. Position film on view box and verify diagnostic quality.
    NOTE: If diagnostic quality is not acceptable, determine problem and repeat procedure.

CHECKLIST

DUTY Performing Support Services

TASK Process x-ray film manually.

ENABLER

1. Identify x-ray film to be processed manually.
2. Identify type of x-ray film to be processed and manufacturer's suggested guidelines.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to process x-ray film manually.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Entered darkroom with cassette containing undeveloped radiograph and turned safelight on.		
2.	Turned overhead lights off and closed door.		
3.	Opened cassette and removed undeveloped film.		
4.	Flashed film with patient identification.		
5.	Secured film in film hanger.		
6.	Submerged film in developer for appropriate amount of time.		
7.	Removed film from developer and briefly rinsed film in water bath (4-5 sec.). Let majority of water drain from film.		
8.	Submerged film in fixer for appropriate amount of time.		
9.	Removed film from fixer and let majority of fixer drip off film.		
10.	Rinsed film in water for one minute.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
11. Removed film from water and hung to air dry.		
12. Positioned film on view box and verified diagnostic quality.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 102

TASK: Take photographs of patient's treatment area.

STANDARD OF PERFORMANCE OF TASK:

Photographs must provide a permanent record of the area of patient receiving external radiation treatment. Photograph views must include before and after records of treatment.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Polaroid camera
Polaroid film
Radiation treatment plan

ENABLING OBJECTIVES:

1. Identify treatment area to be photographed.
2. Mark treatment area on human model.
3. Review established department protocol for photographing patient's treatment area.

***RESOURCES:**

1. Department policy/procedure manual.
2. Treatment plan.
3. Polaroid camera.
4. Human model with treatment area marked.
5. Patient chart.
6. Checklist - Photographing treatment area.

TEACHING ACTIVITIES:

1. Discuss the contents of a treatment plan. (* 1 & 2)
2. Show students a treatment plan and explain the different parts. (* 2)
3. Demonstrate how to verify the marked treatment area to the treatment plan. (* 1,2,4 & 5)

TEACHING ACTIVITIES: (cont.)

4. Discuss the importance of maintaining patient's privacy and making them feel comfortable and at ease about treatment to come. (* 1)
5. Explain different methods for photographing a treatment area. (* 1 & 4)
6. Demonstrate procedure for photographing a treatment area. (* 1,2,3 & 4)
7. Discuss and demonstrate methods of attaching photographs to patient's file. (* 1 & 5)
8. Review procedure for filing patient's treatment chart for future reference. (* 1)
9. Monitor students practicing photographing a treatment area. (* 2,3,4 & 5)
10. Assign students to photograph a treatment area. (* 6)

CRITERION-REFERENCED MEASURE:

The student must verify treatment area, assure patients privacy, take photographs of treatment area, verify picture's content and quality, attach pictures to patient's treatment chart and file the treatment chart for future reference.

PERFORMANCE GUIDE:

1. Review patient's radiation treatment plan.
2. Take pictures of patient's marked treatment area prior to administering treatments.
3. Attach pictures to patient's chart.
4. Take pictures of patient's treatment area after treatment plan has been completed.
5. Attach photographs to patient's chart.
6. File patient's records for future reference.

CHECKLIST

DUTY Performing Support Services

TASK Take photographs of patient's treatment area.

ENABLER

1. Identify treatment area to be photographed.
2. Mark treatment area on human model.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to take photographs of patient's treatment area.

PERFORMANCE DETERMINANTS	YES	NO
1. Reviewed patient's radiation treatment plan.	____	____
2. Took pictures of patient's marked treatment area prior to administering treatments.	____	____
3. Attached pictures to patient's chart.	____	____
4. Took pictures of patient's treatment area after treatment plan had been completed.	____	____
5. Attached photographs to patient's chart.	____	____
6. Filed patient's records for future reference.	____	____

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 103

TASK: Prepare examination room for use.

STANDARD OF PERFORMANCE OF TASK:

All soiled non-usable items must be removed from examination room. The examination table must be cleaned using a disinfectant and draped with clean linens. Necessary equipment, supplies, and materials must be identified, assembled and stored according to established department policies. Aseptic techniques must be maintained at all times.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's request
Sterile linens
Disinfectant
Clean cloth/sponge

ENABLING OBJECTIVES:

1. Identify procedure for maintaining aseptic technique.
2. Identify equipment and supply locations.
3. Review established department protocol for preparing the examination room.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ehrlich, R. and Givens, E. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L. and Callaway, W. (1986). Introduction to radiologic technology. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D. (1986). A radiographers handbook of hospital practice. Boston, MA: Blackwell Scientific Publications.
5. Whitehouse, G. and Worthington, B. (1983) Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications.

***RESOURCES:** (cont.)

6. Typical disposal systems.
7. Checklist - Preparing examination room.

TEACHING ACTIVITIES:

1. Present lecture on importance of examination room preparation. (* 1,2 & 3)
2. Conduct class discussion on what should be included in examination room preparation and why it's important. (* 1)
3. Discuss infection cycle and control. (* 2,4 & 5)
4. Demonstrate procedure for removing and disposing of soiled linens. (* 1,2 & 4)
5. Question students about types of disposable items that might be encountered in an examination room.
6. Demonstrate procedure for disposing of disposable items. (* 1,2,4,5 & 6)
7. Discuss examination table/equipment cleaning procedure and types of disinfectants used. (* 1,2,4 & 5)
8. Demonstrate how to wipe and drape the examination table maintaining aseptic technique. (* 1,2,4 & 5)
9. Demonstrate how to clean examination room equipment. (* 4 & 5)
10. Discuss general examination room supplies and their location. (* 1)
11. Demonstrate how to verify an examination request to determine equipment and supplies needed. (* 1,2,3,4 & 5)
12. Monitor students while they practice preparing an examination room. (* 1 & 6)
13. Assign each student to prepare an examination room for use. (* 7)

CRITERION-REFERENCED MEASURE:

The student must remove soiled linens, dispose of contaminated or disposable items, clean examination table with disinfectant, drape examination table with clean linens, identify and assemble needed equipment/supplies according to department protocol.

PERFORMANCE GUIDE:

1. Remove soiled or non-usable items from examination room and dispose of them, according to established hospital guidelines.
2. Wipe examination table with disinfectant.

PERFORMANCE GUIDE: (cont.)

3. Drape examination table with clean linens, maintaining aseptic technique.
4. Verify next examination and equipment/supplies needed.
5. Assemble needed equipment/supplies and store at appropriate location in examination room, according to established hospital guidelines.

CHECKLIST

DUTY Performing Support Services

TASK Prepare examination room for use.

ENABLER

1. Identify procedure for maintaining aseptic technique.

STUDENT'S NAME____________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's performance while preparing an examination room for use.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Removed soiled and non-usable items from examination room.		
2.	Disposed of disposables in accordance with department protocol.		
3.	Cleaned examination table and equipment with disinfectant.		
4.	Draped examination table with clean linens.		
5.	Verified next exam and equipment/ supplies needed.		
6.	Assembled needed equipment and supplies.		
7.	Stored equipment and supplies in appropriate locations in examination room.		
8.	Maintained aseptic techniques at all times while working in examination room.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 104

TASK: Perform simulation procedures for patient receiving external beam radiation therapy.

STANDARD OF PERFORMANCE OF TASK:

Simulation procedures must duplicate the proposed external beam radiation treatment exactly without variation or error.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Viewing screen
X-ray film
Centimeter gauge
Radiation badge
Marking ink
Laser alignment system
Cotton swabs
Alcohol
Damp cloth
X-ray film holder/cassette
X-ray film processor
Felt markers (water soluble)
External beam radiation simulation system

ENABLING OBJECTIVES:

1. Identify area to receive radiation treatment.
2. Review radiation treatment plan.
3. Assemble tools and supplies needed for simulation.
4. Review established department policy/procedure for performing simulation procedures for external beam radiation.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

3. Hendee, W. (1981). Radiation therapy physics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
5. Vicente, J., Cortes-Funes, H., Viladiu, P., & Muggia, F. (1980). Clinical oncology: The foundation of current patient management (and selected therapeutic developments). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Simulation procedure supplies and materials.
7. X-ray film.
8. Laser alignment system.
9. External beam radiation simulation system.
10. X-ray film processor.
11. Checklist - Performing simulation procedure for external beam radiation.

TEACHING ACTIVITIES:

1. Explain and show students how to greet patient and explain simulation procedure to patient. (* 1 & 2)
2. Explain and demonstrate how to assist patient on simulation table, position and prep patient and cover with a sheet. (* 2,3,4 & 5)
3. Instruct and show students how to align portal target light on general treatment area. (* 2,3,4,5 & 7)
4. Show students how to adjust table until desired distance between simulation and patient is obtained. (* 1)
5. Instruct students to mark tentative treatment area with felt marker. (* 2,3,4,5 & 7)
6. Instruct students to take X-rays of treatment area and show them how to develop film. (* 2,3,4 & 5)
7. Explain and show how to place developed X-ray film on illuminator and mark desired treatment area on the film using felt marker. (* 6,7 & 8)
8. Instruct and show students to realign treatment area with portal target light and remark patient. (* 5 & 9)
9. Instruct students to take second X-ray and develop. (* 2,3,4 & 5)
10. Review procedure to determine if treatment area aligns with portal target light. (* 6,7,8 & 9)
11. Show students how to place permanent marks on patient. (* 3 & 7)

TEACHING ACTIVITIES: (cont.)

12. Explain and demonstrate how to align simulation laser marks with treatment marks. (* 7,8 & 9)
13. Explain and show students how to measure thickness and diameter of patient and mark center on lateral laser line. (* 2,3,4 & 5)
14. Review and demonstrate how to align the target with the lateral mark. (* 8 & 9)
15. Review and show students how to take X-rays and develop film. (* 2,3,4 & 5)
16. Instruct students to check X-rays for alignment. (* 7)
17. Instruct students to repeat step 14-16 until exact alignment is made. (* 1)
18. Explain and demonstrate how to mark final protal treatment area. (* 2,4 & 5)
19. Monitor students as they practice performing simulation procedures for patient receiving external beam radiation therapy. (* 6,7,8,9 & 10)
20. Supervise and evaluate students performing simulation procedures for patients receiving external beam radiation therapy. (* 11)

CRITERION-REFERENCED MEASURE:

The student must greet patient and explain procedure, position and prep patient, align portal target light, adjust table, mark tentative treatment area, take radiograph, develop radiographs, realign treatment area, take second radiograph, place permanent marks on patient, align simulator marks with laser marks, measure thickness and diameter, align target with lateral mark, take X-ray and develop, place permanent mark in lateral area.

PERFORMANCE GUIDE:

1. Greet patient and explain simulation procedure.
2. Assist patient on simulation table.
3. Position and prep the patient.
4. Cover patient with a sheet.
5. Align portal target light on general treatment area.
6. Adjust table until desired distance between simulator and patient is obtained.
7. Mark tentative treatment area with felt marker.
8. Take x-ray of treatment area and develop film.
9. Place developed x-ray film on illuminator and mark desired treatment area on the film using felt marker.

PERFORMANCE GUIDE: (cont.)

10. Realign treatment area with portal target light and remark patient.
    NOTE: Remove old marks that no longer align, using a damp cloth.
11. Take second x-ray and develop.
12. Repeat steps 10 and 11 until treatment area is aligned exactly on the desired treatment area.
13. Place permanent marks on patient, using marking ink and cotton swab.
14. Align simulator laser mark with treatment marks.

CHECKLIST

DUTY Performing Suppport Services

TASK Perform simulation procedures for patient receiving external beam radiation therapy.

ENABLER

1. Identify area to receive radiation treatment.
2. Recall radiation treatment plan.
3. Assemble tools and supplies needed for simulation.

STUDENT'S NAME____________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform simulation procedures for patient receiving external beam radiation therapy.

PERFORMANCE DETERMINANTS	YES	NO
1. Greeted patient and explained simulation procedure.	______	______
2. Assisted patient on simulation table.	______	______
3. Positioned and prepped the patient.	______	______
4. Covered patient with a sheet.	______	______
5. Aligned portal target light on general treatment area.	______	______
6. Adjusted table until desired distance between simulator and patient was obtained.	______	______
7. Marked tentative treatment area with felt marker.	______	______
8. Made x-ray of treatment area and developed film.	______	______
9. Placed developed x-ray film on illuminator and marked desired treatment area on the film using felt marker.	______	______

	PERFORMANCE DETERMINANTS (cont.)	**YES**	**NO**
10.	Realigned treatment area with portal target light and remarked patient.	________	________
11.	Made second x-ray and developed.	________	________
12.	Repeated steps 10 and 11 until treatment area was aligned exactly on the desired treatment area.	________	________
13.	Placed permanent marks on patient, using marking ink and cotton swab.	________	________
14.	Aligned simulator laser mark with treatment marks.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 105

TASK: Process axial tomography (CT) scans.

STANDARD OF PERFORMANCE OF TASK:

CT scans must be processed from the acquired raw data without any loss of data and in accordance with the projection and enhancement techniques dictated by established department policy.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's request
Image processing protocols
Department directives
Processing/enhancement unit

ENABLING OBJECTIVES:

1. Locate tomography processing/enhancement unit.
2. Identify operation procedures for tomography processing/enchancement unit.
3. Verify physician's request with area of anatomy scanned.
4. Review established department procedure for processing axial tomography scans.

***RESOURCES:**

1. Department policy/procedure manual.
2. Moss, A., & Goldberg, H. (1979). Computed tomgraphy, ultrasound and x-ray. New York, NY: Masson Publishing USA, Inc.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Goldberg, H., Higgins, C., & Ring, E. (1985). Contemporary imaging: Magnetic resonance imaging, computed tomograpy, and interventional radiology. St. Louis, MO: C.V. Vosby Company.
5. Haaga, J., & Alfidi, R. (1984). Computed tomography of the brain, head and neck. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

6. Haaga, J., & Alfidi. (1983). Computed tomography of the whole body. St. Louis, MO: C.V. Mosby Company.
7. Haaga, J., & Alfid., R. (1984). Computed tomography of the abdomen. St. Louis, MO: C.V. Mosby Company.
8. Hendee, W. (1983). The physical principles of computed tomography. Boston, MA: Little, Brown and Company.
9. Phost, G., Higgins, C., Morganroth, J., Ritchie, J., & Heinrich, R. (1986). New concepts in cardiac imaging 1986. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
10. Tomography processing/enchancement unit.
11. Raw axial tomography scan data.
12. Checklist - Processing axial tomography scans.

TEACHING ACTIVITIES:

1. Instruct students to obtain raw axial tomography scan record. (* 1 & 11)
2. Explain and show students how to determine system parameters for data returned and processing. (* 2,3,4 & 8)
3. Explain and demonstrate how to identify location of the data on the recorded media. (* 2,3,4 & 8)
4. Instruct and show the students how to retrieve the raw data and manipulate as requested by the physician. (* 5,6,7,9 & 10)
5. Instruct and show the students how to photograph the completed data, manipulate and transfer to hard copy media. (* 10)
6. Review and demonstrate the procedure to file and store manipulated raw data for future retrieval. (* 2,3 & 10)
7. Monitor students as they practice processing axial tomography scans. (* 10 & 11)
8. Supervise and evaluate students processing axial tomography scans. (* 12)

CRITERION-REFERENCED MEASURE:

The student must verify physician's request, locate raw axial tomography data, set system parameters, locate data on media, retrieve and manipulate raw data, photograph manipulated data results and store/file manipulated data.

PERFORMANCE GUIDE:

1. Verify physician's request.
2. Obtain raw axial tomography scan record.
3. Determine system parameters for data returned and processing.
4. Identify location of the data on the recorded media.
5. Retrieve the raw data and manipulate as required by physician's request.
6. Photograph the completed data manipulate to transfer to hard copy media.
7. File and store manipulated raw data for future retrieval.

CHECKLIST

DUTY Performing Support Services

TASK Process axial tomography (CT) scans.

ENABLER

1. Locate tomography processing/enhancement unit.
2. Recall operation procedures for tomography.
3. Verify physician's request with area of anatomy scanned.

STUDENT'S NAME__________________ **DATE**__________

EVALUATOR'S NAME__________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to process axial tomography (CT) scans.

PERFORMANCE DETERMINANTS	YES	NO
1. Verified physician's request.		
2. Obtained raw axial tomography scan record.		
3. Determined system parameters for data returned and processing.		
4. Identified location of the data on the recorded media.		
5. Retrieved the raw data and manipulated as required by physician's request.		
6. Photographed the completed data manipulate to transfer to hard copy media.		
7. Filed and stored manipulated raw data for future retrieval.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 106

TASK: Prepare fluorographic control and phototimer.

STANDARD OF PERFORMANCE OF TASK:

Fluoroscopy and phototiming technique and settings must be established to insure diagnostic images. Radiation exposure to patient and technologist must be kept within ALARA standards.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Technique chart
Physician's request
Fluoro/phototimed radiographic unit

ENABLING OBJECTIVES:

1. Locate fluorographic technique chart.
2. Identify settings for fluorographic control and phototimer.
3. Recall ALARA standards for fluorographic techniques.
4. Review established department procedure for preparing fluorographic control and timer.

*RESOURCES:

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
4. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
5. Croft, B. (1986). Single-proton emission computed tomography. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Radiologic technique exposure chart.
7. Fluoro/phototimer radiographic unit.

***RESOURCES:** (cont.)

8. Checklist - Preparing fluorographic control and phototimer.

TEACHING ACTIVITIES:

1. Identify procedure for interpreting physician's request and discuss correlation between requisition and fluorographic procedures. (* 1,4 & 5)
2. Show students how to check requisition according to department procedure. (* 1)
3. Review procedure for using radiologic technique exposure chart. (* 1,4,5 & 6)
4. Explain and demonstrate selection of accurate mA, KVP, and backup time settings using radiologic technique exposure chart. (* 1,4,5 & 6)
5. Review location of unit and show students how to program MA, kVp, and backup time, and how to select auto exposure mode. (* 1,2,3,4,5,6 & 7)
6. Explain correlation of anatomical regions being examined with photo cell fields or interpretation of unit's fluoro exposure technique charts. (* 4,5 & 6)
7. Show students how to select proper photo cell fields according to anatomical region being examined. (* 1 & 7)
8. Explain and demonstrate method for resetting times by adjusting timer control on unit. (* 3 & 7)
9. Monitor students preparing fluorographic control and phototimer in practice sessions. (* 6 & 7)
10. Supervise and evaluate students preparing fluorographic control and phototimer. (* 8)

CRITERION-REFERENCED MEASURE:

The student must determine procedure to be performed, check fluorographic procedure chart for correct settings, set MA, kVp, and backup timer on radiographic unit, select photo cell fields and reset the timer.

PERFORMANCE GUIDE:

1. Verify physician's request and ascertain the type of procedure to be performed.
2. Check chart for MA, kVp and backup time settings.
3. Program in the required MA, kVp, and backup time on the unit.
4. Set the unit for auto exposure mode.

PERFORMANCE GUIDE: (cont.)

5. Insure proper photo cell fields have been selected for the necessary region of anatomical interest.
6. Reset timer.

CHECKLIST

DUTY Performing Support Services

TASK Prepare fluorographic control and phototimer.

ENABLER

1. Locate fluorographic technique chart.
2. Recall settings for fluorographic control and phototimer.
3. Recall ALARA standards for fluorographic techniques.

STUDENT'S NAME ______________________ **DATE** __________

EVALUATOR'S NAME ______________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare fluorographic control and phototimer.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's request and ascertained the type of procedure to be performed.	_______	_______
2.	Checked chart for MA, kVp and backup time settings.	_______	_______
3.	Programmed in the required mA, kVp, and backup time on the unit.	_______	_______
4.	Set the unit for auto exposure mode.	_______	_______
5.	Insured proper photo cell fields had been selected for the necessary region of anatomical interest.	_______	_______
6.	Reset timer.	_______	_______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 107

TASK: Load empty cassette with x-ray film.

STANDARD OF PERFORMANCE OF TASK:

The x-ray film must be aligned and secured in the film cassette holder without exposing the film.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

X-ray film
Darkroom
Film storage bin
X-ray film cassette holder

ENABLING OBJECTIVES:

1. Assemble empty cassettes to be loaded with x-ray film.
2. Identify types of film to be loaded in cassettes.
3. Review established department procedure for loading x-ray film into empty cassettes.

***RESOURCES:**

1. Department policy/procedure manual.
2. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
3. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
4. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
5. Phillips, M. (1987). Ensuring image quality. St. Louis, MO: C.V. Mosby Company.
6. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
7. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
8. X-ray film.

***RESOURCES:** (cont.)

9. X-ray film bin
10. Empty film cassettes.
11. Darkroom.
12. Checklist - Loading empty cassette with x-ray film.

TEACHING ACTIVITIES:

1. Review location of darkroom and operation of darkroom door locks. (* 1)
2. Show students how to close darkroom door securely after entering. (* 11)
3. Explain types of safelights and demonstrate operation of safelight. (* 2,5,7 & 11)
4. Identify the types of cassettes and methods or opening and closing different types. (* 1,3,4,6 & 10)
5. Demonstrate opening and closing of various cassette. (* 10)
6. Identify location of film storage bin and proper method for opening film bin. (* 1 & 11)
7. Review film identification by speed type, emulsion type, and size. (* 1,4,6 & 8)
8. Show students how to choose correct size and type of film from storage bin. (* 8 & 9)
9. Identify and demonstrate method of placement of film in cassette. (* 2,5,7,8 & 10)
10. Demonstrate closing cassette securely. (* 10)
11. Explain and demonstrate closing of film bin. (* 9)
12. Discuss proper darkroom exiting procedure. (* 1,2,6 & 7)
13. Demonstrate proper procedure to exit darkroom. (* 11)
14. Monitor student loading empty cassettes with x-ray films in practice session. (* 8,9,10 & 11)
15. Supervise and evaluate students loading empty cassettes with x-ray films. (* 12)

CRITERION-REFERENCED MEASURE:

The student must operate the darkroom, open empty cassettes, load cassettes with film, shut cassettes, close film bin and exit darkroom.

PERFORMANCE GUIDE:

1. Enter darkroom and completely shut the door.
2. Turn on safe light.
3. Open empty film cassette.

PERFORMANCE GUIDE: (cont.)

4. Select desired film from the film storage bin.
5. Align and secure film in cassette holder.
6. Verify that the film holder is securely latched shut.
7. Close the film bin and shut off the safelight.
8. Exit darkroom.

CHECKLIST

DUTY Performing Support Services

TASK Load empty cassette with x-ray film.

ENABLER

1. Assemble empty cassettes to be loaded with x-ray film.
2. Identify types of film to be loaded in cassettes.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to load empty cassette with x-ray film.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Entered darkroom and completely shut the door.		
2.	Turned on safe light.		
3.	Opened empty film cassette.		
4.	Selected desired film from the film storage bin.		
5.	Aligned and secured film in cassette holder.		
6.	Verified that the film holder was securely latched shut.		
7.	Closed the film bin and shut off the safelight.		
8.	Exited darkroom.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 108

TASK: Position patient for examination.

STANDARD OF PERFORMANCE OF TASK:

The patient must be positioned so that the examination/treatment area is accessible at all times.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's identification
Examination/treatment table
Physician's orders/treatment plan

ENABLING OBJECTIVES:

1. Identify positions used in examination/treatment.
2. Verify physician's request/treatment plan.
3. Identify extent of patient's mobility/injury.
4. Review established department procedures for positioning patient for examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Bontrager, K., & Anthony, B. (1983). Radiographic anatomy and positioning series (units 1-21). St. Louis, MO: C.V. Mosby Company.
4. Bontrager, K., & Anthony, B. (1987). Textbook of radiographic positioning and related anatomy. St. Louis, MO: C.V. Mosby Company.
5. Kreel, L. (1980). Clark's positioning in radiography (Vols. 1 & 2). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Examination/treatment table.
7. Patient's chart.
8. Human model.
9. Checklist - Positioning patient.

TEACHING ACTIVITIES:

1. Explain and show students how to greet patient and verify patient's identification. (* 1 & 7)
2. Review and demonstrate how to assist patient onto examination/treatment table. (* 2,3,4,5 & 6)
3. Conduct class discussion on positions needed for various examinations/treatments. (* 2,3,4 & 5)
4. Review and demonstrate how to position patient and mark treatment area. (* 2,3,4,5 & 8)
5. Instruct and show students have to maintain patient's comfort and drape with a sheet. (* 1,2,5 & 8)
6. Monitor students as they practice positioning patient for examination. (* 6,7 & 8)
7. Supervise and evaluate students positioning patient for examination. (* 9)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, assist patient onto examination/treatment table, insure patient's comfort and drape patient with a clean cloth.

PERFORMANCE GUIDE:

1. Verify physician's orders/treatment plan.
2. Greet patient and verify patient's identification.
3. Assist patient onto examination/treatment table.
4. Place patient in the position needed to administer examination/treatment and mark treatment area.
   A. Supine.
   B. Prone.
   C. Right lateral recumbent.
   D. Left lateral recumbent.
   E. Upright.
5. Maintain patient's comfort.
6. Drape patient with clean sheet.

CHECKLIST

DUTY Performing Support Services

TASK Position patient for examination.

ENABLER

1. Recall positions used in examination/treatments.
2. Verify physician's request/treatment plan.
3. Establish extent of patient's mobility/injury.

STUDENT'S NAME________________________ **DATE**__________

EVALUATOR'S NAME________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to position patient for examination.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Verified physician's orders/treatment plan.		
2. Greeted patient and verified patient's identification.		
3. Assisted patient onto examination/ treatment table.		
4. Placed patient in the position needed to administer examination/treatment and marked treatment area.		
5. Maintained patient's comfort.		
6. Draped patient with clean sheet.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 109

TASK: Apply coupling media to examination area.

STANDARD OF PERFORMANCE OF TASK:

All air must be removed from between the face of the transducer and the patient's skin.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Coupling media
Transducer
Physician's orders

ENABLING OBJECTIVES:

1. List types of coupling media.
2. Identify area in which coupling media is to be applied.
3. Identify type of examination to be performed.
4. Review established department procedure for applying coupling media to examination area.

***RESOURCES:**

1. Department policy/procedure manual.
2. Athey, P., & Hadlock, F. (1985). Ultrasound in obstetrics and gynecology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
3. Athey, P., & McClendon, L. (1984). Diagnostic ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
4. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.
5. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Coupling media.
7. Transducer.
8. Patient's chart.
9. Checklist - Applying coupling media.

TEACHING ACTIVITIES:

1. Explain and show students how to greet patient and explain procedure to patient. (* 1 & 8)
2. Discuss and show students how to bare the area on the patient to be examined. (* 2,3,4 & 5)
3. Conduct a class discussion on types of coupling media and their use. (* 2,3,4 & 5)
4. Instruct students on how to determine the type of coupling media to be used. (* 2,3,4 & 5)
5. Conduct class discussion on explaining process as done and providing patient as much privacy as possible. (* 1,3 & 5)
6. Explain and demonstrate how to spread coupling media evenly over entire examination area. (* 2,3,4,5 & 6)
7. Explain and demonstrate how to position transducer in coupling media. (* 2,3,4,5 & 7)
8. Monitor students as they practice applying coupling media to examination area. (* 6,7 & 8)
9. Supervise and evaluate students applying coupling media to examination area. (* 9)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain the procedure, bare the area of anatomy to be examined, determine type of coupling media to be used, spread coupling media evenly over area to be examined, and position transducer in coupling media.

PERFORMANCE GUIDE:

1. Verify patient's identification and examination to be performed.
2. Greet, verify and explain procedure to the patient.
3. Bare the area on the patient to be examined.
4. Determine the type of coupling to be used:
   A. Water.
   B. Mineral oil.
   C. Castor oil.
   D. Aqueous gel.
   E. Aqueous lotion.
   NOTE: Inform patient whether coupler will be warm or cold.
5. Spread coupling media evenly over the entire examination area.
   NOTE: Coupling media must eliminate all air between patient's skin and the face of the transducer.
6. Position transducer in coupling media.

CHECKLIST

DUTY Performing Support Services

TASK Apply coupling media to examination area.

ENABLER

1. Recall types of coupling media.
2. Identify area in which coupling media is to be applied.
3. Identify type of examination to be performed.

STUDENT'S NAME ____________________ **DATE** __________

EVALUATOR'S NAME ____________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to apply coupling media to examination area.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified patient's identification and examination to be performed.		
2.	Greeted, verified and explained procedure to the patient.		
3.	Bared the area on the patient to be examined.		
4.	Determined the type of coupling to be used.		
5.	Spread coupling media evenly over the entire examination area.		
6.	Positioned transducer in coupling media.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 110

TASK: Prepare transducer for examination.

STANDARD OF PERFORMANCE OF TASK:

The type of transducer needed for the examination must be determined and any accessory items must be identified and attached to the transducer.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Transducer
Accessory items
Physician's orders

ENABLING OBJECTIVES:

1. Identify type of transducer needed.
2. Recall sizes of transducers and their function.
3. Identify size of transducer needed.
4. Review established department procedure for preparing transducer for examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Athey, P., & Hadlock, F. (1985). Ultrasound in obstetrics and gynecology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
3. Athey, P., & McClendon, L. (1984). Diagnostic ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
4. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.
5. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
7. Transducer.

***RESOURCES:** (cont.)

8. Transducer accessory items.
9. Physician's orders.
10. Checklist - Preparing transducer for examination.

TEACHING ACTIVITIES:

1. Show students how to verify type of examination from physician's order. (* 1 & 9)
2. Conduct class discussion on type of transducer needed for various examinations. (* 2,3,4 & 5)
3. Explain and demonstrate how to determine transducer mobility. (* 2,3,4,5 & 7)
4. Explain how to identify transducer accessories needed. (* 2,4 & 5)
5. Explain and demonstrate how to apply or attach transducer accessories. (* 7 & 8)
6. Monitor students as they practice preparing transducers for examinations. (* 7,8 & 9)
7. Supervise and evaluate students as they prepare transducers for examinations. (* 10)

CRITERION-REFERENCED MEASURE:

The student must verify physician's orders, identify type of examination to be performed, select type and size of transducer, identify accessory items needed for transducer, and apply or attach accessory items to transducer.

PERFORMANCE GUIDE:

1. Verify type of examination from physician's orders:
   A. Abdominal.
   B. Obstetrics/gynecology.
   C. Circulatory system.
   D. Small parts.
   E. Extremities.
   F. Breast.
   G. Orbit (echo-opthalmography).
   H. Ultrasonic localization.
   I. Heart (echocardiography).
   J. Head (echocephalography).
2. Determine the type of transducer needed:
   A. Focused.
   B. Nonfocused.
3. Determine transducer mobility:
   A. Hand-held.
   B. Scanning arm.

PERFORMANCE GUIDE: (cont.)

4. Identify transducer accessories needed:
    - A. Sterile transducer cover.
    - B. Coupling media.
    - C. Dampening material.
5. Apply or attach transducer accessories.

CHECKLIST

DUTY Performing Support Services

TASK Prepare transducer for examination.

ENABLER

1. Identify type of transducer needed.
2. Recall sizes of transducers and their function.
3. Identify size of transducer needed.

STUDENT'S NAME________________ **DATE**________

EVALUATOR'S NAME________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare transducer for examination.

PERFORMANCE DETERMINANTS	YES	NO
1. Verified type of examination from physician's orders.	______	______
2. Determined the type of transducer needed.	______	______
3. Determined transducer mobility.	______	______
4. Identified transducer accessories needed.	______	______
5. Applied or attached transducer accessories.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 111

TASK: Identify ultrasound equipment limitations.

STANDARD OF PERFORMANCE OF TASK:

Ultrasound equipment capabilities must be established so as to maximize examination procedures.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

List of examinations
Ultrasound equipment

ENABLING OBJECTIVES:

1. Recall types of ultrasound equipment.
2. Recall types of ultrasound examinations.
3. Review established department policy for identifying ultrasound equipment limitations.

***RESOURCES:**

1. Department policy/procedure manual.
2. Fleishcher, A., & Everette, J. (1980). Introduction to diagnostic sonography. New York, NY: John Wiley and Sons, Inc.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Athey, P., & McClendon, L. (1984). Diagnostic ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
5. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.
6. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Ultrasound equipment.
8. Checklist - Identifying ultrasound equipment limitations.

TEACHING ACTIVITIES:

1. Conduct class discussion on types of ultrasound procedures. (* 1,2,3 & 6)
2. Demonstrate type of ultrasound to be performed. (* 2,3,4,5 & 6)
3. Identify and demonstrate ultrasound equipment. (* 3,4,5,6 & 7)
4. Conduct class discussion on matching equipment capabilities to examination procedures. (* 2,3 & 4)
5. Monitor students as they practice selecting ultrasound equipment for given procedures. (* 7)
6. Supervise and evaluate students, identifying equipment limitations and selecting ultrasound equipment. (* 8)

CRITERION-REFERENCED MEASURE:

The student must identify type of ultrasound examination to be performed, determine ultrasound equipment needed, and establish equipment capabilities/limitations.

PERFORMANCE GUIDE:

1. Obtain list of examination to be performed.
2. Determine type of ultrasound to be performed:
   A. Real time:
      1. Mechanical.
      2. Linear array.
      3. Phased array.
   B. Doppler:
      1. Audio output.
      2. Visible tracing.
3. Identify ultrasound equipment:
   A. Transmitter:
      1. Transducer.
      2. Pulse generator.
      3. Pulse repeater.
      4. Attenuator.
   B. Receiver:
      1. R F amplifier.
      2. Time gain compensator.
      3. Demodulator.
      4. Video amplifier.
   C. Display modes:
      1. A-mode.
      2. M-mode.
      3. B-mode.

***RESOURCES:** (cont.)

5. Hoffer, P., & Associate Editors. (1986). 1986 Yearbook of nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Shielded vial containing elution.
7. Instrument well.
8. Assay recording forms.
9. Checklist - Analyzing the elution.

TEACHING ACTIVITIES:

1. Instruct and show students how to set background control to zero. (* 1,2,3 & 7)
2. Explain and demonstrate how to set activity range. (* 1,2,3 & 7)
3. Explain and demonstrate how to set energy range for radionuclides to be measured. (* 1,2,3 & 7)
4. Demonstrate how to remove vial containing radionuclide sample from shield using long forceps. (* 2,3,4 & 6)
5. Instruct and show students how to lower radionuclide sample into instrument well using long forceps. (* 2,3,6 & 7)
6. Instruct students how to reselect activity range when necessary. (* 1,2,3 & 7)
7. Discuss procedure for allowing readings to stabilize and demonstrate how to record total activity reading. (* 2,3,4 & 7)
8. Review and show how to use long forceps to remove vial and replace in shield. (* 1,6 & 7)
9. Instruct and demonstrate how to calculate activity concentration in activity per ml. (* 1,2 & 3)
10. Explain and demonstrate how to record activity concentration. (* 1,2,3 & 8)
11. Review department policy concerning labeling vials. (* 1 & 6)
12. Monitor students as they practice analyzing the elution. (* 6,7 & 8)
13. Supervise and evaluate students analyzing the elution. (* 9)

CRITERION-REFERENCED MEASURE:

The student must set background, activity range and energy range, remove radionuclide vial from shielding, place radionuclide vial into instrument well, stabilize readings, record activity readings, replace radionuclide vial in shielding, calculate activity concentration, record activity concentrations, and label vial.

PERFORMANCE GUIDE:

1. Set background control to zero.
2. Set activity range.
3. Set energy range for radionuclide to be measured.
4. Remove vial containing radionuclide sample from shield, using long forceps.
5. Lower radionuclide sample into instrument well, using long forceps.
6. Reselect activity range when necessary.
7. Allow readings to stabilize.
8. Record total activity reading.
9. Remove vial, using long forceps.
10. Replace vial in shield, using long forceps.
11. Calculate activity concentration in activity per ml.
12. Record activity concentrations.
13. Label vials as prescribed by department policy.

CHECKLIST

DUTY Performing Support Services

TASK Analyze the elution.

ENABLER

1. Identify elution to be analyzed.
2. Recall tolerance range for total activity concentration.
3. Locate precalibrated dose calibrator.

STUDENT'S NAME________________ **DATE**________

EVALUATOR'S NAME________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to analyze elution.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Set background control to zero.		
2.	Set activity range.		
3.	Set energy range for radionuclide to be measured.		
4.	Removed vial containing radionuclide sample from shield, using long forceps.		
5.	Lowered radionuclide sample into instrument well, using long forceps.		
6.	Reselected activity range when necessary.		
7.	Allowed readings to stabilize.		
8.	Recorded total activity reading.		
9.	Removed vial, using long forceps.		
10.	Replaced vial in shield, using long forceps.		
11.	Calculated activity concentration in activity per ml.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
12. Recorded activity concentrations.		
13. Labeled vials as prescribed by department policy.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 121

TASK: Calculate quantity of radiopharmaceuticals needed for the day.

STANDARD OF PERFORMANCE OF TASK:

A level of radioactivity must be available, as well as numbers of kits and other compounding materials for completing the day's scheduled workload.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Calculator
Radionuclide decay charts
Dose range chart
Physician's requests for procedures: (Determine the quantity of radiopharmaceuticals needed for the day).

ENABLING OBJECTIVES:

1. Identify radiopharmaceuticals used by department.
2. Locate department workload schedule.
3. Recall methods for calculating quantity of radiopharmaceuticals.
4. Review established department policy/procedure for calculating quantities of radiopharmaceuticals.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
5. Dose range chart/radionuclide decay chart.

***RESOURCES:** (cont.)

6. Physician's request/request log.
7. Department work load schedule.
8. Checklist - Calculating daily radiopharmaceutical needs.

TEACHING ACTIVITIES:

1. Discuss types of radiopharmaceuticals used in the department. (* 1)
2. Explain procedure for assembling physician's requests for procedures requiring radiopharmaceuticals. (* 6 & 7)
3. Demonstrate procedure for logging procedures requiring radiopharmaceuticals. (* 6 & 7)
4. Discuss and demonstrate how to calculate total amount of radioactivity need at time of calibration. (* 2 & 3)
5. Explain radionuclide decay and show students how to use a radionuclide decay chart. (* 2,3,4 & 5)
6. Explain how to calculate radioactivity needed for each radiophamaceutical needed. (* 1,2 & 3)
7. Show students how to calculate radioactivity needed for each radiopharmaceutical. (* 2,3 & 5)
8. Discuss and demonstrate calculating compound materials needed for each radiopharmaceutical. (* 2 & 3)
9. Demonstrate procedure for totaling amounts of each radiopharmaceutical needed that day. (* 2,3 & 4)
10. Supervise students practicing calculating quantities of radiopharmaceuticals needed for a day. (* 5,6 & 7)
11. Evaluate students performance while calculating quantities of radiopharmaceuticals needed for the day. (* 8)

CRITERION-REFERENCED MEASURE:

The student must assemble and log physician's requests for radiopharmaceuticals, calculate amount of radioactivity needed at time of calibration, calculate radioactivity need for each radiopharmaceutical and calculate amount of compounding materials needed to complete day's work.

PERFORMANCE GUIDE:

1. Assemble requests for procedures according to radiopharmaceutical and categorize.

PERFORMANCE GUIDE: (cont.)

2. Calculate total amount of radioactivity needed at time of calibration to prepare radiopharmaceuticals in order to perform all requested procedures, allowing for decay.
3. Calculate radioactivity needed for each radiopharmaceutical at time of calibration.
4. Calculate amounts of other compounding materials required in completing day's scheduled workload.

CHECKLIST

DUTY Performing Support Services

TASK Calculate quantity of radiopharmaceuticals needed for the day.

ENABLER

1. Identify radiopharmaceuticals used by department.
2. Locate department workload schedule.
3. Recall methods for calculating quantity of radiopharmaceuticals.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to calculate quantity of radiopharmaceuticals needed for the day.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Assembled requests for procedures according to radiopharmaceutical and categorize.	_____	_____
2.	Calculated total amount of radioactivity needed at time of calibration to prepare radiopharmaceuticals in order to perform all requested procedures, allowing for decay.	_____	_____
3.	Calculated radioactivity needed for each radiopharmaceutical at time of calibration.	_____	_____
4.	Calculated amounts of other compounding materials required in completing day's scheduled workload.	_____	_____

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 122

TASK: Prepare the radiopharmaceutical.

STANDARD OF PERFORMANCE OF TASK:

The radiopharmaceutical must be assayed and the observed results must be within + or - 10% of the actual prescribed activity.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Long forceps
Protective attire
Assay recording form
Leaded glass work area
Previously calibrated dose calibrator
Prescribed activity level for a specific radiopharmaceutical
Shielded vial containing a radiopharmaceutical

ENABLING OBJECTIVES:

1. Identify type of radiopharmaceutical and how it will be administered.
2. Review established department procedures for handling radiopharmaceuticals.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Heindel, N., Burns, H., Honda, T., & Brady, L. (1978). The chemistry of radiopharmaceutials. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES:** (cont.)

5. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.
6. Assay recording form.
7. Shielded vial label.
8. Checklist - Preparing radiopharmaceuticals.

TEACHING ACTIVITIES:

1. Review dose calibrator operation procedure. (* 4 & 5)
2. Question students on activity and energy range levels for different radiopharmaceuticals. (* 2 & 3)
3. Demonstrate set up procedure for dose calibrator. (* 2,3,4 & 5)
4. Conduct class discussion on shielded vials and their function. (* 1,2 & 3)
5. Stress importance of handling radioactive materials with caution. (* 1,2,3,4 & 5)
6. Present lecture on radiopharmaceutical assay procedure. (* 1,2,3,4 & 5)
7. Demonstrate procedure for removing radiopharmaceutical vial from shield. (* 1,2 & 3)
8. Show students the design and operation of calibration wells. (* 2,3,4 & 5)
9. Explain the meaning of stabilized reading. (* 4 & 5)
10. Demonstrate procedure for obtaining a stabilized reading. (* 4 & 5)
11. Question students on types of records needed for different calibrators. (* 1,2,3,4 & 5)
12. Demonstrate how to complete an assay recording form. (* 2,3,4,5 & 6)
13. Discuss procedure for isotope handling and shielding. (* 2,3,4 & 5)
14. Review label information required on a shielded vial. (* 1,2 & 3)
15. Demonstrate procedure for placing completed radiopharmaceutical information label on shielded vial. (* 2,3 & 7)
16. Explain how to compare observed activity with predicted activity. (* 1)
17. Stress importance of achieving examination result within limits prior to use of radiopharmaceutical. (* 1)
18. Monitor student's practice while preparing a radiopharmaceutical. (* 6 & 7)
19. Assign student to prepare a radiopharmaceutical. (* 8)

CRITERION-REFERENCED MEASURE:

The student must identify how the radiopharmaceutical is to be used, set the dose calibrator, insert vial into calibrator well, obtain stabilized total radioactivity reading, reinsert vial into shield, label shield with radiopharmaceutical information and complete assay recording form in accordance with department protocol.

PERFORMANCE GUIDE:

1. Set background control to zero.
2. Set activity range.
3. Set energy range for the specific radiopharmaceutical.
4. Remove radiopharmaceutical vial from shield with long forceps.
5. Insert radiopharmaceutical vial into vial holder.
6. Lower vial of radiopharmaceutical into calibrator well.
7. Allow reading to stabilize.
8. Record total radioactivity reading on assay recording form.
9. Remove vial of radiopharmaceutical from calibrator well.
10. Reinsert vial of radiopharmaceutical into shield using long forceps.
11. Label shielded vial with total radioactivity reading, time, date, concentration (in mCi/mi), manufacturer, and technologist's initials.
12. Compare observed activity with predicted activity.
13. Repeat procedure if results are outside established limits.

    CAUTION: Do not use pharmaceutical and notify appropriate personnel, as per standard operating procedure, if results are still outside established limits.

CHECKLIST

DUTY Performing Support Services

TASK Prepare the radiopharaceutical.

ENABLER

1. Identify type of radiopharmaceutical and how it will be administered.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare the radiopharmaceutical.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Set background control to zero.	______	______
2.	Set activity range.	______	______
3.	Set energy range for the specific radiopharmaceutical.	______	______
4.	Removed radiopharmaceutical vial from shield with long forceps.	______	______
5.	Inserted radiopharmaceutical vial into vial holder.	______	______
6.	Lowered vial of radiopharmaceutical into calibrator well.	______	______
7.	Allowed reading to stabilize.	______	______
8.	Recorded total radioactivity reading on assay recording form.	______	______
9.	Removed vial of radiopharmaceutical from calibrator well.	______	______
10.	Reinserted vial of radiopharmaceutical into shield using long forceps.	______	______

PERFORMANCE DETERMINANTS	YES	NO
11. Labeled shielded vial with total radioactivity reading, time, date, concentration (in mCi/mi), manufacturer, and technologist's initials.		
12. Compared observed activity with predicted activity.		
13. Repeated procedure if results were outside established limits.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 123

TASK: Perform radiopharmaceutical labeling efficiency test.

STANDARD OF PERFORMANCE OF TASK:

The percent labeling efficiency must not vary from the established criteria for the specific radiopharmaceutical as set by the hospital, regulatory establishment, or ALARA standards.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Syringe
Needles
Syringe shield
Quality control log
Protective clothing
Quality control test kit
Radiopharmaceutical in a shielded vial
Precalibrated radiation detection instrument

ENABLING OBJECTIVES:

1. Identify established labeling efficiency criteria for the specific radiopharmaceutical.
2. Review established department protocol for performing radiopharmaceutical labeling efficiency test.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Billinghurst, M., & Fritzberg, A. (1981). Chemistry for nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.

***RESOURCES: (cont.)**

5. Heindel, N., Burns, H., Honda, T., & Brady, L. (1978). The chemistry of radiopharmaceutials. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Radiopharmaceutical quality control test kit.
7. Quality control kit, performance insert.
8. Manufacturer's established criteria.
9. Checklist - Performing radiopharmaceutical labeling efficiency test.

TEACHING ACTIVITIES:

1. Discuss components of a radiopharmaceutical kit. (* 2,4 & 6)
2. Show students the components of a quality control kit. (* 6)
3. Review meaning of aliquot and safety procedures for withdrawal of aliquot. (* 2,3,4 & 5)
4. Demonstrate radiopharmaceutical aliquot withdrawal procedure. (* 2 & 4)
5. Instruct students to read quality control kit performance insert. (* 7)
6. Explain procedure for calculating labeling efficiency of radiopharmaceutical. (* 1,2,3,4 & 5)
7. Demonstrate procedure for calculating labeling efficiency. (* 2,3,4 & 5)
8. Demonstrate procedure for recording labeling efficiency test results. (* 1)
9. Show students how to compare test results with manufacturer's established criteria. (* 8)
10. Stress importance of test results being within established limits prior to radiopharmaceuticals administration. (* 1)
11. Monitor students practicing performing radiopharmaceutical labeling efficiency test. (* 6,7 & 8)
12. Assign student to perform radiopharmaceutical labeling efficiency test. (* 9)

CRITERION-REFERENCED MEASURE:

The student must assemble the components of the radiopharmaceutical quality control kit, read the kit's performance inset, withdraw the aliquot into a shielded syringe, calculate labeling efficiency, record test results and compare test results with established criteria.

PERFORMANCE GUIDE:

1. Assemble components of radiopharmaceutical quality control test kit.
2. Withdraw aliquot of radiopharmaceutical into shielded syringe.
3. Follow quality control kit's performance insert.
4. Calculate labeling efficiency for radiopharmaceutical.
5. Record labeling efficiency.
6. Compare test results with manufacturer's established criteria.
7. Repeat procedure, if results are outside established limits.

   CAUTION: Do not use pharmaceutical and notify appropriate personnel, as per standard operating procedure, if results are still outside established limits.

CHECKLIST

DUTY Performing support services

TASK Perform radiopharmaceutical labeling efficiency test.

ENABLER

1. Identify established labeling efficiency criteria for the specific radiopharmaceutical.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform radiopharmaceutical labeling test.

PERFORMANCE DETERMINANTS	YES	NO
1. Assembled components of radiopharmaceutical quality control test kit.		
2. Withdrew aliquot of radiopharmaceutical into shielded syringe.		
3. Followed quality control kit's performance insert.		
4. Calculated labeling efficiency for radiopharmaceutical.		
5. Recorded labeling efficiency.		
6. Compared test results with manufacturer's established criteria.		
7. Repeated procedure, if results were outside established limits.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 124

TASK: Process individual radiopharmaceutical (I 125).

STANDARD OF PERFORMANCE OF TASK:

The volume and the activity needed to perform the requested procedure must be calculated and recorded without error and must not exceed maximum permissible dose. The individual dosage must be within + or - 5% of the calculated activity when delivered for administration. The calculated dose must be approved by the dosing physician prior to administration to the patient.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's request
Patient's chart
Dosage formula
Dosage range chart
Radioactivity decay chart
Shielded syringe
Shielded radiopharmaceutical vial
Alcohol wipes
Gloves
Dose calibrator
Calculated volume/activity of patient's dosage
Assay recording form
Calculator

ENABLING OBJECTIVES:

1. Identify procedure requested and requesting physician.
2. Establish volume and activity needed to perform requested procedure.
3. Review established department policy/procedure for processing individual radiopharmaceutical (I 125).

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Billinghurst, M., & Fritzberg, A. (1981). Chemistry for nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
5. Heindel, N., Burns, H., Honda, T., & Brady, L. (1978). The chemistry of radiopharmaceuticals. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.
7. Assay recording form.
8. Checklist - Processing individual radiopharmaceuticals.

TEACHING ACTIVITIES:

1. Present lecture on how to prepare a radiopharmaceutical. (* 1,2,3,4 & 5)
2. Review meaning of uCi/gm and mCi/gm dose measurements. (* 2,3,4 & 6)
3. Discuss information needed from patient's chart. (* 1)
4. Review method of calculation needed to figure amount of activity required. (* 2 & 6)
5. Demonstrate procedure for calculation amount of activity. (* 2 & 6)
6. Explain formulas for figuring elapsed time, decay and volume. (* 2 & 6)
7. Show students how to calculate elapsed time, decay and volume. (* 2 & 6)
8. Discuss and demonstrate method of recording volume/activity of patient's dosage. (* 2,3,4,5,6 & 7)
9. Stress the importance of submitting calculated dose for physician verification. (* 1)
10. Question students on procedure for insertion and withdrawal of needle from vial. (* 2,3,4,5 & 6)
11. Stress the use of safety equipment and procedures when working with radioactive materials. (* 2 & 4)
12. Demonstrate procedure for withdrawing radiopharmaceutical into a unshielded syringe. (* 2,3,4 & 5)

TEACHING ACTIVITIES: (cont.)

13. Discuss and demonstrate procedure for placing syringe into counter well using transfer device. (* 5 & 6)
14. Explain procedure for stabilizing readings. (* 2 & 3)
15. Discuss how to record stabilized reading. (* 1 & 7)
16. Show students how to remove syringe from counter well and place in a lead syringe shield. (* 2,4 & 6)
17. Demonstrate procedure for verifying the correlation between actual dosage and calculated dosage. (* 4 & 6)
18. Explain corrective action for readings not in allowable limits. (* 1)
19. Monitor students practicing preparing an individual radiopharmaceutical. (* 1 & 7)
20. Assign students to process an individual radiopharmaceutical. (* 8)

CRITERION-REFERENCED MEASURE:

The student must calculate activity, elapsed time, decay, volume needed, verify calculated dosage with physician, withdraw the radiopharmaceutical into a syringe, place syringe in a counter well, record stabilized reading, place syringe in shielded vial holder and verify actual dosage to the calculated dosage.

PERFORMANCE GUIDE:

1. Obtain desired radiation dose in uCi/gm or mCi/gm from dosing physician.
2. Obtain patient's 24 hour radioiodine uptake value from patient's chart.
3. Obtain estimated weight of patient from patient's chart.
4. Calculate activity needed, taking into consideration factors such as obesity or pregnancy.
   NOTE: No radioactivity will be administered during pregnancy in the first trimester or unless verified by physician.
5. Determine time elapsed from initial calibration of radiopharmaceutical.
6. Calculate radioactive decay from time of initial calibration.

PERFORMANCE GUIDE: (cont.)

7. Calculate volume of radiopharmaceutical needed to achieve established dosage using following formula:

$$\frac{\text{Activity Needed}}{\text{Volume Needed}} = \frac{\text{Activity of Vial}}{\text{Volume of Vial}}$$

8. Record volume/activity of the patient's dosage.
9. Submit the calculated dosage for physician verification.
10. Insert needle into shielded radiopharmaceutical vial using aseptic technique.
11. Withdraw calculated volume/activity from vial.
12. Lower syringe into dose calibrator well.
13. Allow reading to stabilize for 10 seconds.
14. Record total activity reading.
15. Remove syringe from dose calibrator chamber.
16. Place syringe in shield.
17. Compare activity readings with patient's calculated volume/activity.
18. Repeat procedure if results are outside established limits, adjusting as necessary.

CHECKLIST

DUTY Performing Support Services

TASK Practice individual radiopharmaceuticals.

ENABLER

1. Identify procedure requested and requesting physician.
2. Establish volume and activity needed to perform requested procedure.

STUDENT'S NAME ______________________________ **DATE** __________

EVALUATOR'S NAME ____________________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to practice individual radiopharmaceuticals.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained desired radiation dose in uCi/gm or mCi/gm from dosing physician.		
2.	Obtained patient's 24 hour radioiodine uptake value from patient's chart.		
3.	Obtained estimated weight of patient from patient's chart.		
4.	Calculated activity needed, taking into consideration factors such as obesity or pregnancy.		
5.	Determined time elapsed from initial calibration of radiopharmaceutical.		
6.	Calculated radioactive decay from time of initial calibration.		
7.	Calculated volume of radiopharmaceutical needed to achieve established dosage using following formula: $\frac{\text{Activity Needed}}{\text{Volume Needed}} = \frac{\text{Activity of Vial}}{\text{Volume of Vial}}$ 1		
8.	Recorded volume/activity of the patient's dosage.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
9.	Submitted the calculated dosage for physician verification.		
10.	Inserted needle into shielded radiopharmaceutical vial using aseptic technique.		
11.	Withdrew calculated volume/activity from vial.		
12.	Lowered syringe into dose calibrator well.		
13.	Allowed reading to stabilize for 10 seconds.		
14.	Recorded total activity reading.		
15.	Removed syringe from dose calibrator chamber.		
16.	Placed syringe in shield.		
17.	Compared activity readings with patient's calculated volume/activity.		
18.	Repeated procedure if results were outside established limits, adjusting as necessary.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 125

TASK: Administer radiopharmaceutical.

STANDARD OF PERFORMANCE OF TASK:

Prescribed dosage must be administered to the correct patient, aseptically and without infiltration, while keeping radiation exposure to hospital personnel as low as reasonably achievable according to ALARA standards.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient
Physician's request
Radiopharmaceutical dosage
Administration apparatus

ENABLING OBJECTIVES:

1. Identify if radiopharmaceutical has been prepared.
2. Review establish department protocol for administering a radiopharmaceutical.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Heindel, N., Burns, H., Honda, T., & Brady, L. (1978). The chemistry of radiopharmaceutials. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Thrall, J., & Swanson, D. (1985). Diagnostic interventions in nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES: (cont.)**

6. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.
7. Patient permission form.
8. Checklist - Administering radiopharmaceutical.

TEACHING ACTIVITIES:

1. Stress the need to verify physician order, patient identification and radiopharmaceutical dose prior to administration. (* 1)
2. Discuss department requirements for obtaining and verifying radiopharmaceutical. (* 1)
3. Demonstrate procedure for correlating obtained radiopharmaceutical dose to dose requested. (* 2,3,4,5 & 6)
4. Stress importance of explaining administration procedure to patient prior to administration. (* 1)
5. Instruct students to practice explaining a radiopharmaceutical administration procedure.
6. Conduct class discussion on the importance of obtaining patient's written permission prior to administration. (* 1)
7. Show students procedure for completiong patient permission record. (* 1 & 7)
8. List the different methods of administering a radiopharmaceutical. (* 2,3,4,5 & 6)
9. Question students on appropriate methods of administering radiopharmaceutical for various situations. (* 2,3,4 & 5)
10. Demonstrate methods of radiopharmaceutical administration including intravenous injection, inhalation, intraperitoneal injection and ingestion. (* 2,3,4,5 & 6)
11. Discuss safety procedure for handling radioactive materials. (* 1,2,3,4,5 & 6)
12. Instruct students to practice administering a radiopharmaceutical.
13. Assign student to administer a radiopharmaceutical. (* 8)

CRITERION-REFERENCED MEASURE:

The student must verify the patient's identification, verify the procedure and requested dosage, explain the procedure to the patient, obtain patient's written permission to administer radiopharmaceutical, determine appropriate administration method and administer the radiopharmaceutical in accordance with department protocol.

PERFORMANCE GUIDE:

1. Verify patient's name.
2. Verify examination ordered.
3. Obtain radiopharmaceutical to be administered.
4. Verify radiopharmaceutical dose.
5. Explain procedure to patient.
6. Explain appropriate method of administration to patient: intravenous injection, inhalation, intraperitoneal injection (assisting physician), or ingestion.
7. Obtain patient's permission to proceed.
8. Inject radiopharmaceutical to patient, using proper radiation safety and aseptic techniques according to established procedures.

CHECKLIST

DUTY Performing Support Services

TASK Administer radiopharmaceutical.

ENABLER

1. Identify if radiopharmaceutical has been prepared.
2. Establish department protocol for administering a radiopharmaceutical.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to administer radiopharmaceutical.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Verified patient's name.	______	______
2. Verified examination ordered.	______	______
3. Obtained radiopharmaceutical to be administered.	______	______
4. Verified radiopharmaceutical dose.	______	______
5. Explained procedure to patient.	______	______
6. Explained appropriate method of administration to patient.	______	______
7. Obtained patient's permission to proceed.	______	______
8. Injected radiopharmaceutical to patient, using proper radiation safety and aseptic techniques according to established procedures.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 126

TASK: Prepare imaging room for specific procedure.

STANDARD OF PERFORMANCE OF TASK:

The imaging room must be ready to record the prescribed image. Imaging room preparation will include collimator selection, energy level setting on counting device, data acquisition, and recording media selection.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Imaging room
Scintillation camera
Ancillary equipment
Recording media
Request for a procedure

ENABLING OBJECTIVES:

1. Identify specific procedure to be performed.
2. Identify imaging room to be used.
3. Review established department protocol for preparing imaging room.

***RESOURCES:**

1. Department policy/procedure manual.
2. Armstrong, P., & Wastie, M. (1986). Diagnostic imaging. Boston, MA: Blackwell Scientific Publications Ltd.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Siddigui, A. (1985). Nuclear imaging in pediatrics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Kreel, L., & Steiner, E. (1979). Medical imaging. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES:** (cont.)

6. Siegle, R. (1986). Imaging in internal medicine. Boston, MA: Little, Brown and Company.
7. Troupin, R. (1985). Diagnostic imaging in clinical medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
8. Manufacturer's operation manuals.
9. Checklist - Preparing imaging room.

TEACHING ACTIVITIES:

1. Stress need for visual assessment of patient's condition to determine special imaging acquistion needs. (* 1)
2. Conduct class discussion on conditions which require special set-up to achieve imaging acquisition. (* 6 & 7)
3. List special procedures requiring special conditions for image acquistions. (* 1)
4. Review request/dose verification procedure. (* 2,3 & 6)
5. List types of collimators and ancillary equipment used in image acquisition. (* 2,3,4,5,6 & 7)
6. Demonstrate procedure for assembling and attaching ancillary equipment to camera. (* 1 & 3)
7. Discuss gamma camera peaking methods. (* 2,3,4,5 & 6)
8. Show radionuclide placement under collimator. (* 1 & 8)
9. Demonstrate procedure for selecting and setting energy level on camera control panel and peaking the camera. (* 2,3,4,5,6 & 7)
10. Discuss and demonstrate procedure for setting parameters for the acquistion program. (* 2,4,5,6 & 7)
11. List types of recording devices for imaging data storage. (* 2,4,5,6 & 7)
12. Question students on setting recording media intensity for required diagnostic yields. (* 2,4,5,6,7 & 8)
13. Discuss computer or camera acquisition parameter programming. (* 2,4,5,6 & 7)
14. Demonstrate computer or camera acquistion parameter programming. (* 2,4,5,6,7 & 8)
15. Monitor student's practicing preparing imaging room.
16. Assign student to prepare imaging room for a specific procedure. (* 9)

CRITERION-REFERENCED MEASURE:

The student must make a visual assessment of patients condition, verify requested vs. obtained dosage, select and assemble collimators and ancillary equipment, select/set energy level and program parameters, set up recording devices and program acquisiton parameters.

PERFORMANCE GUIDE:

1. Determine condition of patient.
2. Verify request/dose.
3. Select required collimator and/or other equipment.
4. Calibrate spectrometer for energy range of radionuclide being used.
5. Select and set acquisition criteria as established by department procedure.
6. Ready recording media.
7. Set desired intensity where appropriate.
8. Program computer/instrument acquisition parameters, if indicated for start.

CHECKLIST

DUTY Performing Support Services

TASK Prepare imaging run for specific procedure.

ENABLER

1. Identify specific procedure to be performed.
2. Identify imaging room to be used.
3. Review established department protocol for preparing imaging room.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare imaging room for specific procedure.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Determined condition of patient.		
2.	Verified request/dose.		
3.	Selected required collimator and/or other equipment.		
4.	Calibrated spectrometer for energy range of radionuclide being used.		
5.	Selected and set acquisition criteria as established by department procedure.		
6.	Readied recording media.		
7.	Set desired intensity where appropriate.		
8.	Programmed computer/instrument acquisition parameters.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 127

TASK: Acquire images.

STANDARD OF PERFORMANCE OF TASK:

Image quality must be within established limits/protocol of the department and consistent with the history of the imaging equipment.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient
Patient's chart
Imaging room
Physician's request
Recording instrument
Calibrated patient's dosage

ENABLING OBJECTIVES:

1. Identify type of image to be acquired.
2. Verify patients identification and physicians request.
3. Review established department limits/protocol for acquired image quality.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Siddigui, A. (1985). Nuclear imaging in pediatrics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.

***RESOURCES:** (cont.)

6. Wells, D., & Bernier, D. (1980). *Radionuclido imaging artifacts*. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Armstrong, P., & Wastie, M. (1986). *Diagnostic imaging*. Boston, MA: Blackwell Scientific Publications Ltd.
8. Ballinger, P. (1986). *Merrill's atlas of radiographic positions and radiologic procedures*. St. Louis, MO: C.V. Mosby Company.
9. Chesney, D., & Chesney, M. (1981). *Radiographic imaging* (4th ed.). Boston, MA: Blackwell Scientific Publications Ltd.
10. Checklist - Acquiring images.

TEACHING ACTIVITIES:

1. Review techniques for transferring a patient to the imaging table. (* 1 & 8)
2. Stress importance of assessing the patient's condition prior to transfer. (* 1)
3. Demonstrate different transfer techniques for different patient conditions.
4. Discuss types of detectors used with various anatomical positions. (* 2,3,4,5 & 6)
5. Show students different anatomical positions for acquiring images of various organs. (* 1,4,6,8 & 9)
6. Question student's on procedure used to verify patient positioning under detector. (* 1,4,6,8 & 9)
7. Review procedure for administering the radiopharmaceutical to the patient. (* 1,2,3,4 & 5)
8. Explain operation of various imaging equipment. (* 1,4,6,7 & 9)
9. Discuss what should be demonstrated by image and the importance of image quality. (* 1,4,6,7 & 9)
10. Discuss and demonstrate procedure for calling up and processing images for particular systems. (* 4,6,7 & 9)
11. Show how to evaluate images for diagnostic quality and insure all anatomy is present. (* 4,6,7,8 & 9)
12. Demonstrate how to correct for unsatisfactory images or positioning errors. (*1,2 & 3)
13. Monitor students practicing acquiring images.
14. Assign students to acquire an image. (* 10)

CRITERION-REFERENCED MEASURE:

The student must transfer patient to imaging table, position patient so area of interest is relative to the detector, take images, process image and check images for quality and requested anatomy.

PERFORMANCE GUIDE:

1. Assist patient onto imaging table, taking into consideration patient's condition.
2. Position organ area of interest relative to detector.
3. Check patient's alignment under detector.
4. Administer radiopharmaceutical to patient, if indicated.
5. Take images.
6. Process images.
7. Check images.
8. Repeat procedure, if images do not meet established standards.

CHECKLIST

DUTY Performing Support Services

TASK Acquire images.

ENABLER

1. Identify type of image to be acquired.
2. Verify patients identification and physician's request.
3. Establish department limits/protocol for acquired image quality.

STUDENT'S NAME______________________________**DATE**_________

EVALUATOR'S NAME_____________________________**COURSE**_______

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to acquire images.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Assisted patient onto imaging table, taking into consideration patient's condition.	______	______
2.	Positioned organ area of interest relative to detector.	______	______
3.	Checked patient's alignment under detector.	______	______
4.	Administered radiopharmaceutical to patient, if indicated.	______	______
5.	Took images.	______	______
6.	Processed images.	______	______
7.	Checked images.	______	______
8.	Repeated procedure, if images did not meet established standards.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 128

TASK: Enhance computer image.

STANDARD OF PERFORMANCE OF TASK:

Patient's image must appear on the screen. Essential information must be preserved and selected variables made to enable further interpretation using computer image enhancement techniques.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Computer
Software
Raw data patient study

ENABLING OBJECTIVES:

1. Identify computer software to be used.
2. Obtain patient's raw data study.
3. Review established department protocol for enhancing computer images.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Siddigui, A. (1985). Nuclear imaging in pediatrics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

*RESOURCES: (cont.)

6. Chesney, D., & Chesney, M. (1981). Radiographic imaging (4th ed.). Boston, MA: Blackwell Scientific Publications Ltd.
7. Computer enhancement software instruction manual.
8. Computer enhancement software.
9. Raw data study.
10. Checklist - Enhancing computer images.

TEACHING ACTIVITIES:

1. Conduct class discussion on the advantages of computer enhanced images. (* 2,3,4,5 & 6)
2. List types of image enhancement techniques. (* 1,2,3 & 4)
3. Explain different image enhancement techniques. (* 2,3,5 & 6)
4. Show procedure for loading and running enhancement procedures. (* 1,7 & 8)
5. Demonstrate image enhancement procedures. (* 1,2,3,7 & 8)
6. Discuss patient's raw data study. (* 1 & 9)
7. Demonstrate procedure for loading raw data study into computer. (* 1,7 & 9)
8. Demonstrate procedure for performing imaging enhancement on raw data study. (* 1,2,3,7,8 & 9)
9. Instruct students to practice loading image enhancement software and raw data study, and enhancing the computer image.
10. Assign student to enhance a computer image. (* 10)

CRITERION-REFERENCED MEASURE:

The student must load image enhancement program, load patients raw data study, run enhancement program and enhance the computer image.

PERFORMANCE GUIDE:

1. Determine what variables, if any, need to be enhanced.
2. Select image enhancement technique: background subtraction, foreground enhancement, scaling, contrast enhancement, or smoothing.
3. Call up analysis protocol using computer software.
4. Perform image enhancement.

CHECKLIST

DUTY Performing Support Services

TASK Enhance computer image.

ENABLER

1. Identify computer software to be used.
2. Obtain patient's raw data study.
3. Review established department protocol for enhancing computer images.

STUDENT'S NAME ____________________ **DATE** __________

EVALUATOR'S NAME ____________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to enchance computer image.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Determined what variables, if any, needed to be enhanced.		
2.	Selected image enhancement technique: background subtraction, foreground enhancement, scaling, contrast enhancement, or smoothing.		
3.	Called up analysis protocol using computer software.		
4.	Performed image enhancement.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 129

TASK: Extract patient's blood.

STANDARD OF PERFORMANCE OF TASK:

A sufficient quantity of blood for the prescribed examination must be collected using aseptic technique. The sample must be labeled with patient's name, examination name, time drawn, and requisition number.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient
Patient's chart
Collection system
Physician's request

ENABLING OBJECTIVES:

1. Locate puncture site blood is to be drawn from.
2. Identify quantity of blood needed.
3. Assemble blood sample collection list.
4. Review established department protocol for drawing a blood sample.

***RESOURCES:**

1. Department policy/\procedure manual.
2. Alpert, J., & Wittenburg, S. (1986). Clinicians companion: A study guide for effective and human patient care. Boston, MA: Little, Brown and Company.
3. Klippel, A., & Anderson, C. (1979). Manual of emergency and outpatient techniques. Boston, MA: Little, Brown and Company.
4. Levy, B., & Wegman, D. (1982). Occupational health: Recognizing and preventing work-related diseases. Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

5. Mandell, L., & Ralph, E. (1985). Essentials of infectious diseases. Boston, MA: Blackwell Scientific Publications Ltd.
6. Salm, T., Cutler, B., & Wheeler H. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.
7. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
8. Keats, T. (1984). Emergency radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
9. Blood collection system.
10. Checklist - Drawing blood sample.

TEACHING ACTIVITIES:

1. Discuss patient identification verification procedure. (* 1)
2. Conduct class discussion stressing importance of explaining procedure to patient and obtaining patient's permission prior to starting procedure. (* 1)
3. Explain sample tube label information. (* 1,2,6 & 7)
4. Demonstrate sample tube labeling procedure. (* 1,2,6,7 & 9)
5. Conduct class discussion about blood transmitted infectious diseases. (* 4 & 5)
6. Show student's preventive measure for avoiding contact with contagious/infectious diseases. (* 4 & 5)
7. Explain procedure for applying a tourniquet above the patient's elbow and palpating arm at elbow to locate vein. (* 2,3,6,7 & 8)
8. Demonstrate tourniquet application and vein palpation. (* 2,3,6 & 7)
9. Review method for selecting and cleaning needle insertion site. (* 1,2,3,6 & 7)
10. Demonstrate procedure for cleaning needle insertion site. (* 2,3,6 & 7)
11. Discuss and demonstrate procedure for needle insertion into vein. (* 2,3,6 & 7)
12. Demonstrate procedure for withdrawing blood into collection system. (* 2,3,6,7 & 9)
13. Explain procedure for release of tourniquet and withdrawal of needle while applying pressure to puncture site. (* 2 & 3)

TEACHING ACTIVITIES: (cont.)

14. Discuss and demonstrate aseptic technique for dressing injection site. (* 2 & 7)
15. Show students the method for transferring blood samples from collection system to sample vials and how to secure sample vials for transfer. (* 2 & 7)
16. Explain department protocol for forwarding blood samples to laboratory. (* 1)
17. Monitor students practicing drawing blood samples. (* 9)
18. Assign students to draw a blood sample. (* 10)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification, explain procedure to the patient, obtain patient's permission for procedure in writing, label sample tubes with patient information, perform blood withdrawal procedure, transfer sample from collection system to sample tubes, secure labeled sample tubes for transfer and forward samples to lab.

PERFORMANCE GUIDE:

1. Verify patient's name.
2. Verify order.
3. Explain procedure to patient.
4. Label tube with patient's name, room number, examination name, time drawn, and requisition number.
5. Ask patient's permission to draw sample.
6. Attach tourniquet above elbow.
7. Palpate arm at elbow to find vein.
8. Clean area with alcohol swab, from injection site in a circular motion outward away from site.
9. Insert needle of collection system into vein.
10. Withdraw blood using collecting system.
11. Release tourniquet.
12. Withdraw needle from vein, applying slight pressure over insertion site with gauze or cotton swab.
13. Apply pressure on site with swab.
14. Apply adhesive bandage to injection site.
15. Process sample for storage or use.

CHECKLIST

DUTY Performing Support Services

TASK Extract patient's blood.

ENABLER

1. Locate puncture site blood is to be drawn from.
2. Identify quantity of blood needed.
3. Assemble blood sample collection list.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to extract patient's blood.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified patient's name.		
2.	Verified order.		
3.	Explained procedure to patient.		
4.	Labeled tube with patient's name, room number, examination name, time drawn, and requisition number.		
5.	Asked patient's permission to draw sample.		
6.	Attached tourniquet above elbow.		
7.	Palpated arm at elbow to find vein.		
8.	Cleaned area with alcohol swab, from injection site in a circular motion outward away from site.		
9.	Inserted needle of collection system into vein.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Withdrew blood using collecting system.	________	________
11. Released tourniquet.	________	________
12. Withdrew needle from vein, applied slight pressure over insertion site with gauze or cotton swab.	________	________
13. Applied pressure on site with swab.	________	________
14. Applied adhesive bandage to injection site.	________	________
15. Processed sample for storage or use.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 130

TASK: Prepare radioimmunoassay kit.

STANDARD OF PERFORMANCE OF TASK:

The reagent must be fully reconstituted according to manufacturer's specifications.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Diluent
Volumetric pipette
Radioimmunoassay kit

ENABLING OBJECTIVES:

1. Verify radioimmunoassay kit contents.
2. Identify reagents to be used.
3. Review established department policy/procedure for preparing radioimmunoassay kit.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Billinghurst, M., & Fritzberg, A. (1981). Chemistry for nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
5. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
6. Heindel, N., Burns, H., Honda, T., & Brady, L. (1978). The chemistry of radiopharmaceuticals. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES:** (cont.)

7. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.
8. Radioimmunoassay kit.
9. Manufacturers kit instructions.
10. Volumetric pipette system.
11. Checklist - Preparing radioimmunoassay kit.

TEACHING ACTIVITIES:

1. Discuss the different types of radioimmunoassay kits and their functions. (* 1,2,4 & 6)
2. List the types of radioimmunoassay kits and the types of radioactive solutions included. (* 2,3,4,5,6 & 7)
3. Show students the contents of a radioimmunoassay kit. (* 2,4,6,7 & 8)
4. Question students on the purpose of metal seals/caps on reagent vials and why caution must be used when removing them. (* 1,2,4,8 & 9)
5. Demonstrate reagent vial metal cap/seal removal technique. (* 1,8 & 9)
6. Explain operation of various pipette systems for measuring and adding specified volumes of diluent to reagent vials. (* 2,4,7 & 10)
7. Demonstrate procedures for pipetting diluent into reagent vials. (* 1,2,4,6,7,8,9 & 10)
8. Stress the safety precautions and procedures for the handling of serum to prevent contamination or infection of preparer. (* 1 & 9)
9. Discuss and demonstrate vial recapping procedure to ensure integrity and nonleakage. (* 1,8 & 9)
10. Define swirl mixing vs. agitation mixing. (* 2,3,4,5,6 & 7)
11. Explain the importance of swirl mixing the reagent and letting the vials stand at room temperature to dissolve and stabilize the mixture. (* 2,3,4,5,6 & 7)
12. Stress the importance of gentle swirling to ensure even concentration and complete dissolution of substances. (* 1)
13. Monitor students practicing preparing a radioimmunoassay kit.
14. Assign students to prepare a radioimmunoassay kit. (* 11)

CRITERION-REFERENCED MEASURE:

The student must verify contents of the radioimmunoassay kit, remove metal caps/seals from reagent vials, pipette specified volumes of diluent into reagent vials, recap vials, and mix the reagents until complete dissolution of substance and an even concentration is ensured.

PERFORMANCE GUIDE:

1. Acquire kit from storage location.
2. Remove metal seals and caps from reagent vials.
3. Add specified volume of diluent to each vial using appropriate volumetric pipette when required.
4. Recap each vial.
5. Swirl for 2-3 seconds.
6. Allow reagents to stand at room temperature for at least 30 minutes.
7. Mix intermittently by inversion or swirling of reagents prior to use.

CHECKLIST

DUTY Performing Support Services

TASK Prepare radioimmunoassay kit.

ENABLER

1. Verify radioimmunoassay kit contents.
2. Identify reagents to be used.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare radioimmunassay kit.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Acquired kit from storage location.	______	______
2.	Removed metal seals and caps from reagent vials.	______	______
3.	Added specified volume of diluent to each vial using appropriate volumetric pipette when required.	______	______
4.	Recapped each vial.	______	______
5.	Swirled for 2-3 seconds.	______	______
6.	Allowed reagents to stand at room temperature for at least 30 minutes.	______	______
7.	Mixed intermittently by inversion or swirling of reagents prior to use.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 131

TASK: Prepare radioassay quality control material.

STANDARD OF PERFORMANCE OF TASK:

The lyophilized material must be fully rehydrated according to the manufacturer's specifications.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Diluent
Rubber gloves
Volumetric pipette
Quality control sample

ENABLING OBJECTIVES:

1. Identify type of quality control material is to be assayed.
2. Recall the purpose of radioassay of quality control materials.
3. Assemble and prepare assay equipment/instruments.
4. Review established department procedure for radioassay of quality control materials.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.

***RESOURCES:** (cont.)

5. Pipette instruments.
6. Quality control sample.
7. Diluent.
8. Manufacturer's specifications for quality control material.
9. Checklist - Preparing radioassay quality control material.

TEACHING ACTIVITIES:

1. Discuss types of quality control materials and their functions. (* 2,3 & 4)
2. Explain and show students lyophilized materials and how it is stored and sealed. (* 1,4 & 6)
3. Demonstrate how to open and handle lyophilized material according to manufacturer's instructions. (* 2,3,6 & 8)
4. Discuss and demonstrate procedure for using volumetric pipette to dilute quality control material. (* 2,3,5,6 & 7)
5. Show students how to swirl bottles of diluted control materials. (* 6)
6. Discuss amount of time radioassayed control material should set at room temperature and explain why it's important. (* 1 & 8)
7. Discuss and demonstrate storage procedure for radioassay quality control materials. (* 1 & 6)
8. Supervise students practicing preparing radioassay quality control materials. (* 5,6,7 & 8)
9. Evaluate student performance while preparing radioassay quality control materials. (* 9)

CRITERION-REFERENCED MEASURE:

The student must remove lyophilized material from refrigerator, open quality control material, dilute control material, swirl control material, allow control material to set according to manufacturer's instruction and store or use radioassayed quality control materials.

PERFORMANCE GUIDE:

1. Remove lyophilized material from refrigerator/freezer.
2. Remove metal seal on cap.
3. Remove rubber stopper.

PERFORMANCE GUIDE: (cont.)

4. Pipette specified volume of diluent, using volumetric pipette.
5. Swirl bottles for 2-3 seconds.
6. Allow all material to stand at room temperature for at least 30 minutes.
7. Store and use according to manufacturer's specifications.

CHECKLIST

DUTY Performing Support Services

TASK Prepare radioassay quality control material.

ENABLER

1. Identify type of quality control material to be assayed.
2. Recall the purpose of radioassay of quality control materials.
3. Assemble and prepare assay equipment/instruments.

STUDENT'S NAME____________________________**DATE**_________

EVALUATOR'S NAME__________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to pepare radioassay quality control material.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Removed lyophilized material from refrigerator/freezer.		
2.	Removed metal seal on cap.		
3.	Removed rubber stopper.		
4.	Pipetted specified volume of diluent, using volumetric pipette.		
5.	Swirled bottles for 2-3 seconds.		
6.	Allowed all material to stand at room temperature for at least 30 minutes.		
7.	Stored and used according to manufacturer's specifications.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 132

TASK: Evaluate analysis (assay) kits.

STANDARD OF PERFORMANCE OF TASK:

Precision and accuracy of the new kits must be within + or - 2 standard deviations of the previously established standards for the laboratory.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Unused radioimmunoassay kit
Precision pipettes
Vortex mixer
Centrifuge
Test tubes
Test tube rack
Calibrated scintillation well counter
Patient samples
Quality control sample
Diluent
Established standards for the laboratory

ENABLING OBJECTIVES:

1. Identify quality control sample.
2. Identify previously established standards for laboratory.
3. Review established department policy and procedure for evaluating new assay kits.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

3. Billinghurst, M., & Fritzberg, A. (1981). Chemistry for nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
5. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
6. Heindel, N., Burns, H., Honda, T., & Brady, L. (1978). The chemistry of radiopharmaceutials. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.
8. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
9. Radioimmunoassay kit.
10. Previously established standards for laboratory.
11. Checklist - Testing assay kits.

TEACHING ACTIVITIES:

1. Review procedure for drawing and handling blood serum products. (* 1 & 8)
2. Stress the importance of utilizing aseptic technique when drawing blood. (* 1)
3. Explain how to separate serum from cells using centrifuge. (* 2,3,4,5 & 6)
4. Demonstrate procedure for operating centrifuge. (* 2,3,4 & 5)
5. Discuss the contents of a radioimmunoassay kit. (* 2,4 & 9)
6. List the component of a radioimmunoassay kit. (* 9)
7. Review manufacturer's instructions for preparing the reference standard and quality control sera. (* 9 & 10)
8. Show students how to prepare the reference standard and quality control sera. (* 9)
9. Discuss the procedure for performing a radioimmunoassay study. (* 2,3,4 & 6)
10. Review labeling vortex, incubation, pipette, sequenced timing, centrifuge, decanting and blotting procedures. (* 2,3,4,5,6,7 & 8)

TEACHING ACTIVITIES: (cont.)

11. Demonstrate procedure for performing a radioimmunoassay study. (* 2,3,4 & 5)
12. Explain procedure for sample count acquisition. (* 2,3,4 & 5)
13. Show how to calculate the activity level of the knowns/unknowns from the CPM (counts per minute) (* 2 & 4)
14. Discuss and demonstrate plotting the assay results (calculated values) on graph provided by manufacturer. (* 3,6 & 8)
15. Stress the need to verify the control values plotted, against known standards to verify kit acceptability. (* 1)
16. Identify acceptable performance characteristics of radioimmunoassay kits. (* 2 & 3)
17. Stress accuracy in relation to known standards/quality control standards, internal controls and external controls. (* 2,4 & 10)
18. Discuss notification procedure for nonsuitable results. (* 1)
19. Instruct students to practice evaluating an assay kit. (* 9 & 10)
20. Assign students to evaluate an assay kit. (* 11)

CRITERION-REFERENCED MEASURE:

The student must obtain samples, prepare radioimmunoassay kit, prepare quality control sera, perform radioimmunoassay study, count sample, calculate activity level, plot assay results, review quality control graphs, compare results of new kit for precision and accuracy and determine if kit is acceptable.

PERFORMANCE GUIDE:

1. Obtain patient's blood sample.
2. Separate serum from cells using centrifuge and pour off into separately marked sample tube.
3. Prepare radioimmunoassay kit.
4. Prepare quality control sera.
5. Perform radioimmunoassay study.
6. Count sample.
7. Calculate activity level.
8. Plot assay results.
9. Review quality control graphs.
10. Compare results from "new" kit to previously established standards for laboratory.
11. Evaluate kit for precision and accuracy.
12. Notify supervisor if readings are not acceptable.

CHECKLIST

DUTY Performing Support Services

TASK Evaluate analysis (assay) kits.

ENABLER

1. Identify quality control sample.
2. Identify previously established standards for laboratory.
3. Review established department policy and procedure for evaluating new assay kits.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to evaluate analysis (assay) kits.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Obtained patient's blood sample.	______	______
2.	Separated serum from cells using centrifuge and poured off into separately marked sample tube.	______	______
3.	Prepared radioimmunoassay kit.	______	______
4.	Prepared quality control sera.	______	______
5.	Performed radioimmunoassay study.	______	______
6.	Counted sample.	______	______
7.	Calculated activity level.	______	______
8.	Plotted assay results.	______	______
9.	Reviewed quality control graphs.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Compared results from "new" kit to previously established standards for laboratory.		
11. Evaluated kit for precision and accuracy.		
12. Notified supervisor if readings were not acceptable.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 133

TASK: Count sample.

STANDARD OF PERFORMANCE OF TASK:

The total amount of activity contained in each tube must be measured so that the r2 value is equal to or greater than 0.98.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Radioassay tubes
Radioassay record form
Calibrated scintillation well counter

ENABLING OBJECTIVES:

1. Identify type of sample to be counted.
2. Prepare calibrated scintillation well counter.
3. Review established department protocol for counting samples.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Billinghurst, M., & Fritzberg, A. (1981). Chemistry for nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
5. Heindel, N., Burns, H., Honda, T., & Brady, L. (1978). The chemistry of radiopharmaceuticals. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Thrall, J., & Swanson, D. (1985). Diagnostic interventions in nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES:** (cont.)

7. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.
8. Well counter operation manual.
9. Spectrometer operation manual.
10. Radioassay recording form.
11. Checklist - Counting sample activity.

TEACHING ACTIVITIES:

1. Discuss and demonstrate procedure for setting range for sample being counted. (* 1,2,3,4,5 & 7)
2. Review spectometer calibration procedure.
3. Show students how to calibrate spectometer. (* 9)
4. Explain correct procedure for placement of tubes in counter well. (* 2,3,4,5,6 & 7)
5. Demonstrate placement and order of tubes in counter well. (* 2,3,4,5,6 & 7)
6. Identify the amount of time required to obtain a correct number of counts without statistical error. (* 1,2,4 & 8)
7. Demonstrate how to count tubes using sufficient time to eliminate statistical errors. (* 1,2,4 & 8)
8. Show how to record counts per minute for each tube on radioassay recording form. (* 1,2,4 & 10)
9. Explain how to calculate the correlation between counts of the known sample and the unknown sample and record the difference. (* 2,4 & 7)
10. Stress the need to recount sample if r2 is less than 0.98.
11. Review procedure for notifying appropriate personnel if r2 is less than 0.98. (* 1)
12. Monitor students practicing counting a sample. (* 8 & 9)
13. Assign student to count a sample. (* 11)

CRITERION-REFERENCED MEASURE:

The student must identify the sample to be counted, set counter well and spectometer, arrange sample tubes in well, count the activity of the sample, record count for each tube on radioassay recording form, correlate known sample counts to unknown sample counts and determine if the sample should be recounted.

PERFORMANCE GUIDE:

1. Set energy range for radionuclide being counted.
2. Calibrate spectrometer if required.
3. Place tubes to be counted in tray or chain, maintaining order in which they are to be counted.
4. Obtain counts over sufficient time to discount counting statistics as important source of error.
5. Record data in counts per minute for each tube.
6. Calculate/record the correlation (r) between the counts of the known and unknown samples.
7. Recount the sample if r2 is less than 0.98.
8. Notify appropriate personnel if r2 remains below 0.98.

CHECKLIST

DUTY Performing Support Services

TASK Count sample.

ENABLER

1. Identify type of sample to be counted.
2. Prepare calibrated scintillation well counter.

STUDENT'S NAME________________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to count sample.

PERFORMANCE DETERMINANTS	YES	NO
1. Set energy range for radionuclide being counted.	______	______
2. Calibrated spectrometer if required.	______	______
3. Placed tubes to be counted in tray or chain, maintaining order in which they were to be counted.	______	______
4. Obtained counts over sufficient time to discount counting statistics as important source of error.	______	______
5. Recorded data in counts per minute for each tube.	______	______
6. Calculated/recorded the correlation (r) between the counts of the known and unknown samples.	______	______
7. Recounted the sample if r2 was less than 0.98.	______	______
8. Notified appropriate personnel if r2 remained below 0.98.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 134

TASK: Prepare reference standards.

STANDARD OF PERFORMANCE OF TASK:

Reference standards must be prepared in accordance with manufacturer's dilution/ preparation protocols. All reference standards must be prepared using an accurate precision dispensing instrument. Reference standards must be prepared with less than 5% error.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Reference standards
Product data sheet
Precision pipette
Dilutant (when required)

ENABLING OBJECTIVES:

1. Identify reference standard to be used.
2. Locate manufacturer's product standard sheet for the reference standard.
3. Review establish department protocol for preparing a reference standard.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Billinghurst, M., & Fritzberg, A. (1981). Chemistry for nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

5. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
6. Thrall, J., & Swanson, D. (1985). Diagnostic interventions in nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.
8. Reference standard kit.
9. Product data sheet.
10. Checklist - Preparing reference standard.

TEACHING ACTIVITIES:

1. Define reference standard and explain its function in nuclear medicine. (* 2,3,4,5,6 & 7)
2. Discuss the product data sheet and how it is used. (* 8 & 9)
3. Explain what it means to aliquot the standard. (* 2,4,6,8 & 9)
4. Review technique for removing metal caps/seals from vials and infection control procedure. (* 2,3,4 & 5)
5. Stress importance of tapping the vial gently on counter prior to removing stopper. (* 1 & 9)
6. Discuss and demonstrate pipetting diluent into reference standard's vial. (* 2,3,4,5,6 & 7)
7. Demonstrate recapping procedure so that leakage does not occur. (* 2,3,4,5,6,7 & 8)
8. Explain reason for inverting capped vial. (* 1 & 9)
9. Show students how to invert vial to allow reconstitution of standard. (* 2,4,7,8 & 9)
10. Discuss use of product data sheet for reconstitution time. (* 9)
11. Demonstrate procedure for reinverting the vial and gently swirling mixture prior to use. (* 2,3,4,5,6,7 & 8)
12. List manufacturer's recommendations for storage and use. (* 9)
13. Monitor student's practice while preparing a reference standard.
14. Assign students to prepare a reference standard. (* 10)

CRITERION-REFERENCED MEASURE:

The student must remove the metal caps/seal from the standard's vial, aliquot the diluent in the vial, recap the vial, reconstitute the reference standard and swirl the standard prior to use.

PERFORMANCE GUIDE:

1. Obtain reference standard and product data sheet.
2. Aliquate the necessary dilutant precisely using the product data sheet for the reference standard.
3. Invert the vial or container to remove any loose standard from the inner walls and stopper.
4. Allow the standard to stand and reconstitute per the data sheet.
5. Invert and swirl the reconstituted standards.

CHECKLIST

DUTY Performing Support Services

TASK Prepare reference standards.

ENABLER

1. Identify reference standard to be used.
2. Locate reference standard's manufacturer's product standard sheet.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare reference standards.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Obtained reference standard and product data sheet.	______	______
2.	Aliquated the necessary dilutant precisely using the product data sheet for the reference standard.	______	______
3.	Inverted the vial or container to remove any loose standard from the inner walls and stopper.	______	______
4.	Allowed the standard to stand and reconstitute per the data sheet.	______	______
5.	Inverted and swirled the reconstituted standards.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 135

TASK: Collect urine samples.

STANDARD OF PERFORMANCE OF TASK:

Patient and bed linens must be clean and dry. Specimen must be labeled including patient's name, identification number, date and time of specimen collection. Procedure must be recorded on patient's chart.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Lab requisition slip
Label
Patient's chart
Specimen container
Bedpan, urinal, or commode
Physician's order/request

ENABLING OBJECTIVES:

1. Identify procedure specimen is being collected for.
2. Locate specimen labels and lab requisition slip.
3. Review established department policy/procedure for collection of urine samples.

***RESOURCES:**

1. Department policy/procedure manual.
2. Salm, T., Cutler, B., & Wheeler H. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.
3. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

4. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.
5. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
6. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
7. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
8. Lab requisition slip.
9. Labeled specimen container.
10. Checklist - Collecting urine samples.

TEACHING ACTIVITIES:

1. Review procedure for verifying physician's order and patient's identification. (* 1)
2. List equipment needed to collect urine sample. (* 2,4,6 & 7)
3. Discuss specimen container label information. (* 2,4,5,6 & 7)
4. List information needed for specimen label. (* 1 & 8)
5. Demonstrate how to fill out a specimen container label and attach it to the container. (* 6,7 & 8)
6. Discuss and demonstrate procedure for completing a lab requisition. (* 1,4,6,7 & 9)
7. Stress the need to assess the patient's condition and aid patient if necessary. (* 1)
8. Discuss methods for obtaining a urine sample.
9. Demonstrate procedure for placing specimen into container. (* 2,3,4,5,6 & 7)
10. Explain procedure for disposing of remaining urine and cleaning equipment. (* 1)
11. Stress the importance of washing hands and arms after handling urine samples to avoid contamination and disease transfer. (* 1,2,5,4 & 9)
12. Monitor students practicing labeling a specimen container and filling container.
13. Review procedure for completing a lab requisition. (* 6,7 & 8)
14. Assign student to collect a urine sample. (* 10)

CRITERION-REFERENCED MEASURE:

The student must verify physician's request and patient identification, assemble equipment, collect specimen, label specimen container, complete lab requisition, submit urine sample to supervisor and clean area and equipment.

PERFORMANCE GUIDE:

1. Check physician's order.
2. Verify patient's identity and explain procedure.
3. Wash hands.
4. Assemble equipment.
5. Fill out specimen label:
   A. Patient's name.
   B. Patient's identification number.
   C. Date and time of collection.
6. Attach label to specimen container.
7 Fill out lab requisition slip:
   A. Patient's name.
   B. Patient's identification number.
   C. Tests to be done.
   D. Physician's name.
   E. Designate STAT or ROUTINE.
8. Provide privacy.
9. Assist patient to commode, bedpan, or urinal as condition dictates.
   Note: Ambulatory patient collects specimen unaided.
10. Instruct patient to void.
11. Collect urine specimen and pour into labeled specimen cup, measuring as indicated.
12. Empty remainder of urine into toilet.
13. Clean equipment and return to storage.
14. Wash hands.
15. Assure patient's comfort.
16. Take labeled specimen to lab with completed requisition slip.
17. Chart date, time, and characteristics of specimen.

CHECKLIST

DUTY Performing Support Services

TASK Collect urine samples.

ENABLER

1. Identify procedure specimen is being collected for.
2. Locate specimen labels and lab requisition slip.

STUDENT'S NAME________________ **DATE**________

EVALUATOR'S NAME________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to collect urine samples.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Checked physician's order.		
2.	Verified patient's identity and explained procedure.		
3.	Washed hands.		
4.	Assembled equipment.		
5.	Filled out specimen label:		
	- Patient's name.		
	- Patient's identification number.		
	- Date and time of collection.		
6.	Attached label to specimen container.		
7.	Filled out lab requisition slip:		
	- Patient's name.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
7. Filled out lab requisition slip: (cont.)		
- Patient's identification number.		
- Tests to be done.		
- Physician's name.		
- Designated STAT or ROUTINE.		
8. Provided privacy.		
9. Assisted patient to commode, bedpan, or urinal as condition dictates.		
10. Instructed patient to void.		
11. Collected urine specimen and poured into labeled specimen cup, measuring as indicated.		
12. Emptied remainder of urine into toilet.		
13. Cleaned equipment and returned to storage.		
14. Washed hands.		
15. Assured patient's comfort.		
16. Took labeled specimen to lab with completed requisition slip.		
17. Charted date, time, and characteristics of specimen.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 136

TASK: Perform computer data acquisition.

STANDARD OF PERFORMANCE OF TASK:

The correct patient study must be retrieved with no loss of information.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Computer
Necessary software
Patient study storage file
Request for the study
Patient identification information

ENABLING OBJECTIVES:

1. Identify type of computer acquisition requested.
2. Recall software needed to obtain data acquisition.
3. Review established department procedure for performing data acquisition.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
5. Digital computer system.
6. Storage media.
7. Analysis computer software.
8. Checklist - Performing computer data acquisition.

TEACHING ACTIVITIES:

1. Explain and show students how to locate storage device in file. (* 1 & 6)
2. Instruct and demonstrate how to insert device into disc/tape drive and access computer using available software. (* 1 & 5)
3. Explain and show students how to recall information from storage device to computer's memory (* 2,3 & 4)
4. Conduct class discussion on analysis protocol including static, dynamic, list, and multigated aquisition modes.
5. Show students how to select analysis protocol. (* 5,6 & 7)
6. Explain data manipulation in acquisitions mode such as background correction, splice profiles, interpolation, smoothing, etc. (* 2,3 & 4)
7. Instruct and demonstrate how to display study on computer video screen. (* 5)
8. Monitor students as they practice performing computer data acquisition. (* 5,6 & 7)
9. Supervise and evaluate students performing computer data acquisition. (* 8)

CRITERION-REFERENCED MEASURE:

The student must verify patient's study data, locate file on storage device, access patient's data using computer software, recall patient's data into computer memory, select analysis protocol and display study on video screen.

PERFORMANCE GUIDE:

1. Verify patient's name whose study is to be retrieved.
2. Locate storage device in file.
3. Insert device into disc/tape drive.
4. Access computer using available software.
5. Recall information from storage device to computer's memory.
6. Select analysis protocol.
7. Display study on computer video screen.

CHECKLIST

DUTY Performing Support Services

TASK Perform computer data acquisition.

ENABLER

1. Identify type of computer acquisition requested.
2. Recall software needed to obtain data acquisition.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform computer data acquisition.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Verified patient's name whose study was to be retrieved.		
2.	Located storage device in file.		
3.	Inserted device into disc/tape drive.		
4.	Accessed computer using available software.		
5.	Recalled information from storage device to computer's memory.		
6.	Selected analysis protocol.		
7.	Displayed study on computer video screen.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 137

TASK: Draw region of interest.

STANDARD OF PERFORMANCE OF TASK:

The region of interest must incorporate data from that part of the patient's body which the interpreter wants to analyze.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Computer software
Placement device
Request for a procedure
Computer, raw data image, video screen

ENABLING OBJECTIVES:

1. Recall computer software being used.
2. Identify computer placement device to be used.
3. Verify region of interest to be analyzed.
4. Review established department procedure for drawing region of interest.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
5. Computer software.
6. Computer placement device.
7. Digital computer system.
8. Checklist - Drawing region of interest.

TEACHING ACTIVITIES:

1. Explain and demonstrate how to call up analysis protocol using computer software. (* 5 & 7)
2. Conduct class discussion on methods of ROI placement and demonstrate each. (* 2,3,4,6 & 7)
3. Explain and show students how to outline area(s) of interest using a placement device. (* 2,3,4 & 7)
4. Explain and demonstrate how to check ROI using cinematic display if applicable. (* 1,2,3 & 4)
5. Instruct and demonstrate how to store ROI in computer memory. (* 5 & 7)
6. Monitor students as they practice drawing region of interest. (* 5,6 & 7)
7. Supervise and evaluate students drawing region of interest. (* 8)

CRITERION-REFERENCED MEASURE:

The student must call up analysis program, select placement device, outline area of interest, verify region of interest outlined with area requested, and store region of interest in computer memory.

PERFORMANCE GUIDE:

1. Call up analysis protocol using computer software.
2. Select method of ROI placement: light pen, cursor lines, joy stick, or automatic.
3. Outline area(s) of interest using a placement device.
4. Check ROI (using cinematic display if applicable).
5. Store ROI in computer memory.

CHECKLIST

DUTY Performing Support Services

TASK Draw region of interest.

ENABLER

1. Recall computer software being used.
2. Identify computer placement device to be used.

STUDENT'S NAME ______________________ **DATE** __________

EVALUATOR'S NAME ______________________ **COURSE** ________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to draw region of interest.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Called up analysis protocol using computer software.	______	______
2.	Selected method of ROI placement: light pen, cursor lines, joy stick, or automatic.	______	______
3.	Outlined area(s) of interest using a placement device.	______	______
4.	Checked ROI (using cinematic display if applicable).	______	______
5.	Stored ROI in computer memory.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 138

TASK: Display computer results for physician's interpretation.

STANDARD OF PERFORMANCE OF TASK:

The demographic data, images, region of interest, and quantification data must be available for analysis.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Computer
Alternate display methods
Analyzed nuclear medicine study

ENABLING OBJECTIVES:

1. Review computer data analysis results.
2. Recall procedure calling up computer program.
3. Review established department procedure for displaying computer results for physician.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
5. Digital computer system.
6. Analyzed computer data.
7. Checklist - Displaying computer results for physician's interpretation.

TEACHING ACTIVITIES:

1. Explain and show students how to greet physician and to determine computer results to be interpreted. (* 1 & 4)
2. Conduct class discussion on type of display methods. (* 2 & 3)
3. Explain how to select display method and demonstrate display method. (* 5)
4. Show students how to display patient demographic data. (* 2,3,4 & 5)
5. Explain and demonstrate how to display static and cinematic sequential images in original form. (* 5)
6. Instruct and demonstrate how to display images in enhanced form. (* 2,3 & 6)
7. Explain and show how to display images with ROI drawn over relevant areas. (* 2,3 & 6)
8. Review and demonstrate how to display quantified information. (* 2,3 & 6)
9. Explain and show students how to discuss results with physician. (* 1)
10. Monitor students as they practice displaying computer results for physician's interpretation. (* 5 & 6)
11. Supervise and evaluate students displaying computer results for physician's interpretation. (* 7)

CRITERION-REFERENCED MEASURE:

The student must greet physician, select display method, display demographic data, and cinematic images, call up enhanced images, regions of interest and quantified information, and discuss results with physician.

PERFORMANCE GUIDE:

1. Greet physician and determine computer results to be interpreted.
2. Select display method (live, videocassette, or film).
3. Display patient demographic data.
4. Display static or cinematic sequential images in original form.
5. Display images in enhanced form.
6. Display images with ROI drawn over relevant area.
7. Display quantified information: profiles, count flow, or curves.
8. Discuss results with physician.

CHECKLIST

DUTY Performing Support Services

TASK Display computer results for physician's interpretation.

ENABLER

1. Review computer data analysis results.
2. Recall procedure calling up computer program.

STUDENT'S NAME____________________________ **DATE**__________

EVALUATOR'S NAME__________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to display computer results for physician's interpretation.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Greeted physician and determined computer results to be interpreted.		
2.	Selected display method (live, videocassette, or film).		
3.	Displayed patient demographic data.		
4.	Displayed static or cinematic sequential images in original form.		
5.	Displayed images in enhanced form.		
6.	Displayed images with ROI drawn over relevant area.		
7.	Displayed quantified information:		
	- profiles		
	- count flow		
	- curves		
8.	Discussed results with physician.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 139

TASK: Record accumulated radiation doses on radiotherapy treatment charts.

STANDARD OF PERFORMANCE OF TASK:

Total daily radiation dosage must be measured in rads and recorded on patient's treatment charts. Weekly and monthly accumulated radiation dosage must be calculated and recorded on patient's chart. Total accumulated radiation dosage must not exceed the total planned radiation treatment dosage.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Panel
Patient's chart
Pen/pencil
Calculator
External radiation treatment machine control

ENABLING OBJECTIVES:

1. Locate patient's radiotherapy chart.
2. Identify planned radiation dosage.
3. Recall method for measuring radiation dosage.
4. Review established department procedure for recording accumulated radiation dosage.

***RESOURCES:**

1. Department policy/procedure manual.
2. Casciato, D., & Lowitz, B. (1987). Manual of bedside oncology (2nd ed.). Boston, MA: Little, Brown and Company.
3. Fischer, D., & Marsh, J. (1982). Cancer therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
6. External radiation treatment machine controls.
7. Patient's treatment plan/chart.
8. Checklist - Recording accumulated radiation dosage.

TEACHING ACTIVITIES:

1. Explain and show students how to verify rad counter total on treatment machine control panel. (* 2 & 6)
2. Explain procedure and show students how to enter total daily rad count on patient's chart. (* 2,5 & 7)
3. Review and demonstrate how to calculate total accumulated weekly and monthly column. (* 3,4 & 7)
4. Demonstrate how to record total accumulated dosage in weekly or monthly column. (* 7)
5. Explain and show how to verify that accumulated dosage did not exceed planned treatment dosage. (* 1 & 7)
6. Monitor students as they practice accumulated radiation doses on radiotherapy treatment charts. (* 6 & 7)
7. Supervise and evaluate students recording accumulated radiation doses on radiotherapy treatment chart. (* 8)

CRITERION-REFERENCED MEASURE:

The student must verify rad count on control panel, enter rad dosage on patient's chart, calculate total accumulated radiation dosage, and verify accumulated dosage with planned treatment dosage.

PERFORMANCE GUIDE:

1. Verify rad counter total on treatment machine control panel.
2. Enter total daily rad count on patient's chart.
3. Calculate total accumulated weekly and monthly radiation dosage.
4. Record total accumulated dosage in weekly or monthly column.
5. Verify that total accumulated dosage did not exceed planned treatment dosage.

CHECKLIST

DUTY Performing Support Services

TASK Record accumulated radiation doses on radiotherapy treatment charts.

ENABLER

1. Locate patient's radiotherapy chart.
2. Recall method for measuring radiation dosage.

STUDENT'S NAME ______________________ **DATE** __________

EVALUATOR'S NAME ______________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to record accumulated radiation doses on radiotherapy treatment charts.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Verified rad counter total on treatment machine control panel.	______	______
2.	Entered total daily rad count on patient's chart.	______	______
3.	Calculated total accumulated weekly and monthly radiation dosage.	______	______
4.	Recorded total accumulated dosage in weekly or monthly column.	______	______
5.	Verified that total accumulated dosage did not exceed planned treatment dosage.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 140

TASK: Calculate external beam radiation treatment plan dosage.

STANDARD OF PERFORMANCE OF TASK:

The radiation treatment plan dosage must provide the monitor unit (MU) setting and the maximum allowable dosage (MD) without error. Established radiation treatment dosage must be verified through hand calculation.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Task In Radiation Therapy And Diagnostic Ultrasound Research Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Calculator
Brain book
Pen/pencil
Physician's orders
Patient's chart
Treatment plan/contour drawing

ENABLING OBJECTIVES:

1. Verify patient's identification with radiation treatment plan.
2. Recall the meaning of MU, DM, TD and MD.
3. Review established department policy/procedure for calculating external beam radiation treatment plan dosage.

***RESOURCES:**

1. Department policy/procedure manual.
2. Casciato, D., & Lowitz, B. (1987). Manual of bedside oncology (2nd ed.). Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

3. Hendee, W. (1981). Radiation therapy physics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Moss, W., Brand, W., & Battifora, H. (1979). Radiation oncology: Rationale, technique, results (5th ed.). St. Louis, MO: C.V. Mosby Company.
5. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Treatment plan/contour drawing.
7. Patient's chart.
8. Physician's order.
9. Checklist - Calculating external beam radiation treatment plan.

TEACHING ACTIVITIES:

1. Explain to students how to verify physician's order treatment plan and contour drawing. (* 1,6,7 & 8)
2. Demonstrate how to review physician's order, treatment plan and contour drawing oncologists.
3. Explain and demonstrate how to determine the planned radiation treatment depth/penetration. (* 2,3,4 & 5)
4. Show students how to identify treatment field size. (* 2,3 & 5)
5. Instruct and show students how to calculate equivalent square for treatment field size. (* 2,3 & 5)
6. Explain and demonstrate how to determine percentage of depth dose and monitor unit settings using the brain book. (* 1,2,3 & 4)
7. Explain and demonstrate how to determine radiation treatment dose for each part from physician's orders. (* 3,4,6,7 & 8)
8. Instruct and show students how to verify radiation treatment dosage by hand calculation. (* 3,4,5 & 6)
9. Demonstrate how to record maximum dose (MD) and monitor units (MU) on patient's chart and treatment plan. (* 3,4,5 & 6)
10. Monitor students as the practice calculating external beam radiation treatment plan dosage. (* 6,7 & 8)
11. Supervise and evaluate students calculating external beam radiation treatment plan dosage. (* 9)

CRITERION-REFERENCED MEASURE:

The student must review physician's orders, treatment plan and contour drawings; identify planned treatment penetration, and treatment field size; determine radiation treatment dose for each port; verify radiation treatment dose by hand calculations and record MU and MD on patient's chart and treatment plan.

PERFORMANCE GUIDE:

1. Obtain physician's orders, treatment plan, and contour drawing.
2. Review orders, plans, and drawing with radiation therapist or oncologist.
3. Determine the planned radiation treatment depth/ penetration.
4. Identify treatment field size.
5. Calculate equivalent square for treatment field size.
6. Determine percentage of depth dose and monitor unit settings using the brain book.
7. Determine radiation treatment dose for each port from physician's order.
8. Verify radiation treatment dosage by hand calculation:
   Tumor dose (TD) divided by percentage of depth dose = maximum dose (MD).
   Maximum dose divided by machine output = Monitor Units (MU) (setting for machine).
9. Record maximum dose (MD) and Monitor Units (MU) on patient's chart and treatment plan.

CHECKLIST

DUTY Performing Support Services

TASK Calculate external beam radiation treatment plan dosage.

ENABLER

1. Recall the meaning of MU, DM, TD and MD.

STUDENT'S NAME **DATE**

EVALUATOR'S NAME **COURSE**

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to calculate external beam radiation treatment plan dosage.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained physician's orders, treatment plan, and contour drawing.		
2.	Reviewed orders, plans, and drawing with radiation therapist or oncologist.		
3.	Determined the planned radiation treatment depth/penetration.		
4.	Identified treatment field size.		
5.	Calculated equivalent square for treatment field size.		
6.	Determined percentage of depth dose and monitored unit settings using the brain book.		
7.	Determined radiation treatment dose for each port from physician's order.		
8.	Radiation treatment dosage by hand calculation.		
9.	Recorded Maximum Dose (MD) and Monitored Units (MU) on patient's chart and treatment plan.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 141

TASK: Schedule block-cutting procedures to fabricate treatment devices.

STANDARD OF PERFORMANCE OF TASK:

The treatment device must be cut and fabricated to exact dimensions prior to date treatment is to start.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Task In Radiation Therapy And Diagnostic Ultrasound Research Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Treatment plan
Materials list
Block-cutting room schedule
Contour drawing of treatment area

ENABLING OBJECTIVES:

1. Locate contour drawing that treatment device is to be patterned from.
2. Recall types of treatment devices which require block cutting.
3. Review established department policy for scheduling block cutting procedures.

***RESOURCES:**

1. Department policy/procedure manual.
2. Hendee, W. (1981). Radiation therapy physics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
3. Kartha, P., & Thompson, P. (1982). Dosimetry workbook. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES (con't.)**

4. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
5. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Block-cutting room schedule.
7. Radiation treatment plan.
8. Checklist - Scheduling block-cutting procedures.

TEACHING ACTIVITIES:

1. Explain and show students how to determine treatment device to be fabricated from treatment plan. (* 2,4,5 & 7)
2. Explain and demonstrate how to determine time needed to fabricate treatment device. (* 1,2,4,5 & 7)
3. Conduct class discussion on materials used for fabrication. (* 3,4 & 5)
4. Review ordering procedure for materials not on hand. (* 1)
5. Show how to determine date fabrication must begin (relative to date of treatment). (* 3,4 & 7)
6. Review how to check block-cutting schedule. (* 1,2 & 6)
7. Review and show students how to schedule and record date for block cutting on cutting room schedule and treatment plan. (* 6)
8. Monitor students as the practice scheduling block-cutting procedures to fabricate treatment devices. (* 6 & 7)
9. Supervise and evaluate students scheduling block-cutting procedures to fabricate treatment devices. (* 8)

CRITERION-REFERENCED MEASURE:

The student must identify treatment device to be fabricated, determine time needed for fabrication process, identify materials needed for fabrication, identify materials needed for fabrication, identify materials not in stock and reorder stock, establish treatment beginning date, verify block-cutting room schedule, and record date for block-cutting on cutting room schedule and radiation treatment plan.

PERFORMANCE GUIDE:

1. Obtain treatment plan and determine treatment device to be fabricated.
2. Determine time needed to fabricate treatment device.
3. Determine materials needed for fabrication.
4. Identify materials on hand and materials to order.
5. Establish date treatment is to begin and date fabrication must begin.
6. Check block-cutting room schedule.
7. Identify and record date for block cutting on cutting room schedule and treatment plan.

CHECKLIST

DUTY Performing Support Services

TASK Schedule block-cutting procedures to fabricate treatment devices.

ENABLER

1. Locate contour drawing that treatment device is to be patterned from.
2. Recall types of treatment devices which require block cutting.

STUDENT'S NAME________________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to schedule block-cutting procedures to fabricate treatment devices.

PERFORMANCE DETERMINANTS	YES	NO
1. Obtained treatment plan and determined treatment device to be fabricated.	______	______
2. Determined time needed to fabricate treatment device.	______	______
3. Determined materials needed for fabrication.	______	______
4. Identified materials on hand and materials to order.	______	______
5. Established date treatment is to begin and date fabrication must begin.	______	______
6. Checked block-cutting room schedule.	______	______
7. Identified and recorded date for block cutting on cutting room schedule and treatment plan.	______	______

PERFORMANCE OBJECTIVE NO. 142

TASK: Prepare contour drawing of the radiation treatment area.

STANDARD OF PERFORMANCE OF TASK:

The contour drawing must graphically depict the shape of patient's body, shape of treatment area, diameter of treatment area, and the thickness at center, lower and upper borders of treatment area. Diameter and thickness measurements must be recorded on the contour drawing.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient
Pen/pencil
Body caliper
French curve
Treatment plan
Contour drawing paper

ENABLING OBJECTIVES:

1. Identify radiation treatment area to be drawn.
2. Recall shape of patient's body.
3. Review established department policy/procedure for preparing contour drawing of radiation treatment area.

***RESOURCES:**

1. Department policy and procedure manual.
2. Kartha, P., & Thompson, P. (1982). Dosimetry workbook. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
3. Hendee, W. (1981). Radiation therapy physics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES:** (cont.)

4. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
6. Graphic drawing instruments.
7. Radiation treatment plan.
8. Contour drawing paper.
9. Checklist - Preparing contour.

TEACHING ACTIVITIES:

1. Instruct students on how to review treatment plan. (* 1 & 7)
2. Explain and show students how to greet patient, verify identification and explain procedure to patient. (* 1)
3. Review and demonstrate how to assist patient onto examination table and position them appropriately. (* 1 & 5)
4. Identify treatment area and show students how to measure thickness at center, lower and upper borders. (* 2,3,4 & 6)
5. Demonstrate how to mold a french curve to patient's body over treatment area. (* 2,3,4 & 6)
6. Instruct and demonstrate how to mark center of field, lateral borders, and/or upper and lower borders of treatment area on the french curve. (* 3,4 & 6)
7. Instruct and shows students how to remove french curve from patient and place on contour paper. (* 1,6 & 8)
8. Explain and demonstrate how to draw the shape of the patient's body marking the borders of the treatment area. (* 6 & 8)
9. Demonstrate how to record dimensions and thickness measurements in appropriate location on contour drawing. (* 6 & 8)
10. Show students how to verify measurements and treatment area location before dismissing patient. (* 1)
11. Monitor students as they practice preparing contour drawings of radiation treatment area. (* 6,7 & 8)
12. Supervise and evaluate students preparing contour drawings of radiation treatment area. (* 9)

CRITERION-REFERENCED MEASURE:

The student must verify patient identification and explain procedure, measure thickness at center, lower and upper borders of treatment area, mold french curve to treatment area, mark center and borders of treatment area on french curve, transfer french curve marking to contour paper, record thickness measurements onto contour drawing, and verify measurements and treatment area location.

PERFORMANCE GUIDE:

1. Review treatment plan.
2. Greet patient, verify patient identification and explain procedure.
3. Assist patient onto examination table and position them so treatment area is accessible.
4. Identify proposed treatment area and measure thickness at center, lower and upper borders.
5. Mold a french curve to patient's body over treatment area.
6. Mark center of field, lateral borders, and/or upper and lower borders of treatment area on the french curve.
7. Remove french curve from patient's body and place on contour paper.
8. Draw shape of patient's body marking the borders of the treatment area.
9. Record dimensions and thickness measurements in appropriate locations on contour drawing.
10. Verify measurements and treatment area location before dismissing patient.

CHECKLIST

DUTY Performing Support Services

TASK Prepare contour drawing of the radiation treatment area.

ENABLER

1. Identify radiation treatment area to be drawn.
2. Recall shape of patients body.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare contour drawing of the radiation treatment area.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Reviewed treatment plan.	______	______
2.	Greeted patient, verified patient identification and explained procedure.	______	______
3.	Assisted patient onto examination table and positioned them so treatment area was accessible.	______	______
4.	Identified proposed treatment area and measured thickness at center, lower and upper borders.	______	______
5.	Molded a french curve to patient's body over treatment area.	______	______
6.	Marked center of field, lateral borders, and/or upper and lower borders of treatment area on the french curve.	______	______
7.	Removed french curve from patient's body and placed on contour paper.	______	______
8.	Drew shape of patient's body marking the borders of the treatment area.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Recorded dimensions and thickness measurements in appropriate locations on contour drawing.	______	______
10. Verified measurements and treatment area location before dismissing patient.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 143

TASK: Fabricate treatment shell using the direct technique.

STANDARD OF PERFORMANCE OF TASK:

Radiotherapy treatment shell must be fabricated on patient using direct plaster of Paris bandage wrapping technique. The treatment shell must be applied, cut, removed, and reassembled.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report # 9.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Plastic wrap
Paraffin gauze
Sterile gauze
Lead strips
Tape
Treatment table/chair
Cutting tool
Immobilization device
Tube gauze
Plaster of Paris bandages
Calipers
Water and basin
Spatulas
Rubber bathing cap
Infrared lamp
Lubricant (jelly, oil, vaseline)
Marking pens
Head rest/support
Work bench
Physician's/oncologist's request
Protractor
Patient's radiation treatment plan
Lead strips

ENABLING OBJECTIVES:

1. Identify area of anatomy to receive a treatment shell.
2. Assemble tools and materials needed to fabricate a treatment shell.
3. Review established department procedure for fabricating treatment shell using direct method.

*RESOURCES:

1. Department policy/procedure manual.
2. Bleck, E. (1974). Atlas of plaster cast techniques (2nd ed.). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
3. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
4. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
5. Physician's/oncologist's request.
6. Patient's chart/treatment plan.
7. Treatment shell fabrication supplies and materials.
8. Checklist - Fabricating a treatment shell using the direct method.

TEACHING ACTIVITIES:

1. Instruct students on how to verify physician's/ oncologist's request. (* 1,2 & 3)
2. Conduct class discussion on needed tools and materials. (* 1,2,3 & 7)
3. Demonstrate how to assemble and prepare tools. (* 2 & 7)
4. Review how to greet patient, verify patient identification and explain procedure to patient. (* 1,5 & 6)
5. Review and demonstrate how to assist patient onto examination table and position appropriately. (* 1 & 4)
6. Explain and demonstrate how to mark the boundaries of the area to be covered by plaster bandages. (* 2,4 & 7)
7. Stress and show students how to insert breathing straws if appropriate. (* 2)
8. Explain and show students how to measure between anatomical points using calipers. (* 2 & 7)

TEACHING ACTIVITIES: (cont.)

9. Conduct class discussion on types of protection used for hairy surfaces, facial areas and skin areas. (* 2 & 3)
10. Demonstrate how to apply protection to areas to be covered by plaster. (* 2,3 & 7)
11. Explain and show students how to attach immobilization and separation devices. (* 2 & 7)
12. Conduct class discussion on sequence in which plaster of Paris bandage strips are applied. (* 2)
13. Demonstrate how to apply plaster of Paris bandage strips. (* 2 & 7)
14. Explain and show students how to cut the shell along the separation line using a knife or cutting tool. (* 2 & 7)
15. Demonstrate how to remove the shell in the appropriate direction. (* 2)
16. Instruct and show students how to measure the dimensions of the mold assembly and compare to original measurements. (* 2 & 3)
17. Discuss ways to adjust the mold if necessary. (* 2,3 & 4)
18. Show students how to reassemble the shell pieces and label with patient information. (* 1,2,3 & 7)
19. Instruct students to place shell aside or under infra-red lamp to dry. (* 2)
20. Review procedure for scheduling next phase of treatment. (* 1)
21. Show students how to record procedure on patient's chart and treatment plan. (* 1,5 & 6)
22. Monitor students as they practice fabricating treatment shell using direct technique. (* 5,6 & 7)
23. Supervise and evaluate students fabricating treatment shell using direct technique. (* 8)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, position patient, prepare area to be covered, apply plaster of Paris strips, cut shell along separation line, remove shell, reassemble shell pieces, attach identification tab to shell, schedule patient for next phase of treatment, and record procedure on patient's chart and treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Assemble and prepare needed tools and materials.
   NOTE: Materials and tools should be prepared ahead as much as possible so as not to keep the patient in the fabricating room longer than necessary.
3. Greet patient, verify patient identification, and explain procedure.
4. Assist patient onto examination table or chair and position patient so area to be treated is accessible.
5. Prepare the area to be covered:
   A. Mark the boundaries of the area to be covered by plaster bandages.
   B. Insert breathing straws in nostrils or mouth if appropriate.
   C. Measure between indicated anatomical points using calipers.
   D. Apply protection to areas to be covered by plaster:
      1. Hairy surfaces:
         a. Rubber cap.
         b. Thin plastic wrap.
         c. Vaseline.
         d. Paraffin gauze.
      2. Facial areas:
         a. Tube gauze.
      3. Skin areas:
         a. Light coating of oil.
   E. Attach immobilization and separation devices:
      1. Immobilization devices:
         a. Neck support.
         b. Head holder.
         c. Soft wedges.
         d. Angled head or body boards.
      2. Separation line:
         a. Lead strip.
         CAUTION: Extend lead strip well beyond planned separation line to insure that patient will not be cut.
         NOTE: Lubricate all surfaces with medium such as vaseline and smooth down all visible hair against skin.
6. Apply prepared plaster of Paris bandage strips in predetermined sequence:
   A. Dip the plaster of Paris bandage rolls in water.
      NOTE: Do not squeeze out excess fluid from roll.

PERFORMANCE GUIDE (cont.)

6. Apply prepared plaster of Paris bandage strips in predetermined sequence: (cont.)
    - B. Wrap entire area to be covered.
      NOTE: Stroke wrapping with moistened fingers and palms to press out air and create smooth finish.
    - C. Apply finishing strips with cuffs:
        1. Press water from finishing strips by squeezing between index and middle finger.
        2. Turn under edge of finishing strips to form cuff.
    - D. Apply plaster sequentially to separate sections.
      NOTE: Allow each section to harden separately, applying a separating medium (grease) where the next section will overlap.
    - E. Instruct patient to remain as immobile as possible to allow the shell to harden to initial set.
    - F. Clean up splashes, bowls and tools immediately.
7. Cut the shell along the separation line were the lead strips were placed using a knife or cutting tool.
8. Remove shell in the appropriate direction to avoid undercuts and ease shell forward from the patient's body.
9. Measure the dimensions of the mold assembly and compare to original measurements.
   NOTE: Adjustments may be necessary to achieve true interplane distances.
10. Reassemble the shell pieces.
    NOTE: Clamps or fasteners may be needed to hold pieces together.
11. Attach identification information to shell.
12. Place shell aside or under infra-red lamp to dry completely.
13. Schedule patient return for next phase of treatment and dismiss patient.
14. Record procedure on patient's chart and treatment plan.

CHECKLIST

DUTY Performing Support Services

TASK Fabricate treatment shell using the direct technique.

ENABLER

1. Identify area of anatomy to receive a treatment shell.
2. Assemble tools and materials needed to fabricate a treatment shell.
3. Review established department procedure for fabricating treatment shell using direct method.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to fabricate treatment shell using the direct technique.

PERFORMANCE DETERMINANTS	YES	NO
1. Verified physician's/oncologist's request.		
2. Assembled and prepared needed tools and materials.		
3. Greeted patient, verified patient identification, and explained procedure.		
4. Assisted patient onto examination table or chair and positioned patient so area to be treated was accessible.		
5. Prepared the area to be covered:		
- Marked the boundaries of the area to be covered by plaster bandages.		
- Inserted breathing straws in nostrils or mouth if appropriate.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
5. Prepared the area to be covered: (con't)		
- Measured between indicated anatomical points using calipers.	________	________
- Applied protection to areas to be covered by plaster.	________	________
- Attached immobilization and separation devices.	________	________
6. Applied prepared plaster of Paris bandage strips in predetermined sequence:		
- Dipped the plaster of Paris bandage rolls in water.	________	________
- Wrapped entire area to be covered.	________	________
- Applied finishing strips with cuffs.	________	________
- Applied plaster sequentially to separate sections.	________	________
- Instructed patient to remain as immobile as possible to allow the shell to harden to initial set.	________	________
- Cleaned up splashes, bowls and tools immediately.	________	________
7. Cut the shell along the separation line where the lead strips were placed using a knife or cutting tool.	________	________
8. Removed shell in the appropriate direction to avoid undercuts and ease shell forward from the patient's body.	________	________
9. Measured the dimensions of the mold assembly and compared to original measurements.	________	________
10. Reassembled the shell pieces.	________	________
11. Attached identification information to shell.	________	________

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
12.	Placed shell aside or under infra-red lamp to dry completely.	________	________
13.	Scheduled patient return for next phase of treatment and dismissed patient.	________	________
14.	Recorded procedure on patient's chart and treatment plan.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 144

TASK: Fabricated treatment mold using the indirect method.

STANDARD OF PERFORMANCE OF TASK:

Radiotherapy mold or solid cast to be used in the fabrication of a treatment shell must be fabricated using the indirect method utilizing liquid resin acrylic or stone plaster, reinforced with plaster of paris. The procedure must be recorded on the patient's chart including fabricator's name and fabrication date.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report # 9.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's/Oncologist's request
Drill
Plaster of Paris bandages
Marking pens
Alginate impression materials
Calipers
Treatment table/chair
Ear plugs
Internal eye shields
Protractor
Eye lubricant and solution
Spatulas
Stone plaster material
Lead strips
Immobilization device
Patient's chart
Head rest/support
Eye pad
Breathing straws
Swabs
Water and basin
Box mold
Work Bench

CONDITIONS FOR PERFORMANCE OF TASK: (con't.)

Lead strips
Rubber bathing cap
Plastic wrap
Sterile gauze
Tape
Cutting tool
Tube gauze
Paraffin gauze
Infrared lamp
Patient's radiation treatment plan
Oven (with temperature and timer controls)

ENABLING OBJECTIVES:

1. Recall meaning of "indirect method."
2. Identify area to be molded for fabrication of a treatment shell.
3. Recall tools and materials needed to fabricate a treatment mold using indirect method.
4. Assemble tools and materials needed to fabricate a treatment mold using indirect method.
5. Review established department policy/procedures for fabricating a treatment mold using indirect method.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bleck, E. (1974). Atlas of plaster cast techniques (2nd ed.). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
3. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
4. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
5. Physician/oncologist request.
6. Patient's chart/treatment plan.
7. Treatment mold fabrication materials and supplies.
8. Alginate impression material.
9. Checklist - Fabricating a treatment mold using indirect method.

TEACHING ACTIVITIES:

1. Instruct students on procedure for verifying physicians's/oncologist's request. (* 1 & 6)
2. Conduct class discussion on needed tools and materials for fabricating a treatment mold. (* 2,3 & 4)

TEACHING ACTIVITIES: (con't)

3. Demonstrate how to assemble and prepare tools needed to fabricate treatment mold. (* 7)
4. Review procedure for greeting patient, verifying patient's identification and explaining procedure to patient. (* 5 & 6)
5. Review and demonstrate how to assist patient onto examination table and position appropriately. (* 1,3 & 4)
6. Explain and demonstrate how to identify and mark the boundaries of the area to be covered by plaster bandages. (* 1,2,5,6 & 7)
7. Review and show students how to insert breathing straws, ear plugs, and eyeshields as needed. (* 2)
8. Explain and show students how to measure between anatomical parts using calipers. (* 2 & 7)
9. Instruct and demonstrate how to apply protection to areas covered by plaster. (* 2 & 7)
10. Show students how to mix alginate and water according to manufacturer's directions. (* 2,7 & 8)
11. Instruct and demonstrate procedure for applying alginate to area to be masked. (* 2 & 8)
12. Review how to apply prepared plaster of Paris bandage strips if alginate mold is to be reinforced. (* 2,7 & 8)
13. Instruct and demonstrate how to remove mold after alginate has set. (* 2)
14. Show sudents how to clean patient after molding process is complete. (* 3 & 4)
15. Demonstrate how to measure negative mold assembly and compare to original measurements. (* 7 & 8)
16. Discuss how to make adjustments to obtain true interplane distances. (* 8)
17. Instruct and demonstrate how to fabricate a solid cast or mold before the alginate shrinks. (* 2)
18. Review and show how to attach identification information to cast or mold. (* 1,2,4 & 8)
19. Instruct students to place cast or mold in temperature controlled oven or under infra-red heat lamp to dry. (* 1 & 2)
20. Show students how to remove positive cast or mold from impression mold when dry. (* 2 & 7)
21. Review and demnstrate how to record procedure on patient's chart and treatment plan. (* 1,5 & 6)
22. Monitor students as they practice fabricating treatment molds using the indirect method. (* 5,6,7 & 8)

TEACHING ACTIVITIES: (cont.)

23. Supervise and evaluate students fabricating treatment molds using the indirect method. (* 9)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, position patient, prepare area to be molded, make alginate mask of treatment area, remove set alginate mask, fabricate solid cast or mold from alginate mask, and record procedure on patient's chart/treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Assemble and prepare needed tools and materials.
   NOTE: Materials and tools should be prepared ahead as much as possible, so as not to keep the patient in the fabricating room longer than necessary.
3. Greet patient, verify patient identification, and explain procedure.
4. Assist patient onto examination table or chair and position patient, so area to be treated is accessible.
5. Prepare the area to be covered:
   A. Mark the boundaries of the area to be covered by plaster bandages.
   B. Insert breathing straws, ear plugs and eyeshields as appropriate.
   C. Measure between indicated anatomical points using calipers.
   D. Apply protection to areas to be covered by plaster.
   NOTE: Alginate does not require a separating medium for removal from the skin.
6. Mix the alginate and water according to manufacturer's directions.
   NOTE: Mix only as much at a time as can be applied without hardening.
7. Apply the alginate rapidly in a thin coat over the entire treatment area, starting at high points and allowing to flow over all areas.
8. Apply additional batches until all areas of interest are covered.
   NOTE: For intracavitary mold impressions, a stem is placed in the alginate for aid in mold removal.

PERFORMANCE GUIDE: (cont.)

8. Apply additional batches until all areas of interest are covered. (con't)
   NOTE: When the alginate mold impression is to be reinforced by plaster of Paris bandages, refer to Performance Guide #143, step # 6.
9. Remove mold after alginate has set:
   A. Cut apart mold, if it must be removed in pieces.
   B. Remove plaster of Paris backing.
   C. Place vaseline on plaster backing surface that was in contact with the alginate.
      NOTE: Vaseline will act like an adhesive when the alginate is replaced.
   D. Lift off the flexible alginate impression and place it back in its original position on the plaster backing.
   E. Remove intracavitary impression by pulling gently on stem.
   F. Reassemble and seal the mold, if in separate pieces.
   G. Cleanse patient:
      1. Remove any splashes and casting material form patient and table.
      2. Remove internal eye shields and ear plugs.
      3. Clean eye shields and ear plugs according to manufacturer's recommendations.
      4. Place antiseptic and lubricant drops in patient's eyes.
10. Fabricate a solid cast or mold immediately before the alginate shrinks:
    A. Measure negative mold assembly and compare to original measurements.
       NOTE: Adjust as appropriate to obtain true interplane distances.
    B. Mix plaster of Paris, stone plaster, or resin acrylic material.
    C. Block open ends of mold and reinforce joints with plaster of Paris bandages or sealing strips.
    D. Coat surface of alginate mold with a separating agent.
    E. Create a positive cast or mold by pouring mixture material on or in the alginate impression mold.
       NOTE: When completely filling the mold tap or vibrate to release trapped air bubbles.
    F. Attach identification information to cast or mold.

PERFORMANCE GUIDE: (cont.)

    G. Place cast or mold in temperature-controlled oven or under infra-red heat lamp to dry.
    H. Remove positive cast or mold from impression mold after appropriate drying period.

11. Record procedure on patient's chart or treatment plan including fabricator's name and date of fabrication.

CHECKLIST

DUTY Performing Support Services

TASK Fabricated treatment mold using the indirect method.

ENABLER

1. Recall meaning of "indirect method."
2. Identify area to be molded for fabrication of a treatment shell.
3. Recall tools and materials needed to fabricate a treatment mold using indirect method.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to fabricate treatment mold using the indirect method.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Verified physician's/oncologist's request.	______	______
2. Assembled and prepared needed tools and materials.	______	______
3. Greeted patient, verified patient identification, and explained procedure.	______	______
4. Assisted patient onto examination table or chair and positioned patient, so area to be treated was accessible.	______	______
5. Prepared the area to be covered:		
- Marked the boundaries of the area to be covered by plaster bandages.	______	______
- Inserted breathing straws, ear plugs and eyeshields as appropriate.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
5. Prepared the area to be covered: (cont.)		
- Measured between indicated anatomical points using calipers.	________	________
- Applied protection to areas to be covered by plaster.	________	________
6. Mixed the alginate and water according to manufacturer's directions.	________	________
7. Applied the alginate rapidly in a thin coat over the entire treatment area, starting at high points and allowing to flow over all areas.	________	________
8. Applied additional batches until all areas of interest are covered.	________	________
9. Removed mold after alginate has set:		
- Cut apart mold, if it must be removed in pieces.	________	________
- Removed plaster of Paris backing.	________	________
- Placed vaseline on plaster backing surface that was in contact with the alginate.	________	________
- Lifted off the flexible alginate impression and placed it back in its original position on the plaster backing.	________	________
- Removed intracavitary impression by pulling gently on stem.	________	________
- Reassembled and sealed the mold, if in separate pieces.	________	________
10. Cleansed patient:		
- Removed any splashes and casting material from patient and table.	________	________
- Removed internal eye shields and ear plugs.	________	________

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Cleansed patient: (cont.)		
- Cleaned eye shields and ear plugs according to manufacturer's recommendations.	________	________
- Placed antiseptic and lubricant drops in patient's eyes.	________	________
11. Fabricated a solid cast or mold immediately before the alginate shrunk:		
- Measured negative mold assembly and compared to original measurements.	________	________
- Mixed plaster of Paris, stone plaster, or resin acrylic material.	________	________
- Blocked open ends of mold and reinforced joints with plaster of Paris bandages or sealing strips.	________	________
- Coated surface of alginate mold with a separating agent.	________	________
- Created a positive cast or mold by pouring mixture material on or in the alginate impression mold.	________	________
- Attached identification information to cast or mold.	________	________
- Placed cast or mold in temperature-controlled oven or under infra-red heat lamp to dry.	________	________
- Removed positive cast or mold from impression mold after appropriate drying period.	________	________
12. Recorded procedure on patient's chart or treatment plan including fabricator's name and date of fabrication.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 145

TASK: Prepare intracavitary mold or surface applicator mold to receive radioactive sealed sources.

STANDARD OF PERFORMANCE OF TASK:

Intracavitary mold or surface applicator must be prepared to receive radioactive sealed sources including mold identification verification, reviewing position, distances, lengths, angles, and number of nylon tubes to secure source, and the need for protective lead shielding. Retainers, guides, and shields must be attached to intracavitary mold or applicator. The procedure must be recorded on the radiation treatment plan including fabricator's name and fabrication date.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report # 9.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's/oncologist's request
Calipers
Radiation treatment plan
Nylon tubes
Positive mold or cast
Protractor
Heat crimping tool
Work bench

ENABLING OBJECTIVES:

1. Recall meaning and purpose of a intercavitary mold and a surface mold.
2. Locate radioactive sealed source to be used.
3. Review patient's radiation treatment plan.

ENABLING OBJECTIVES: (cont.)

4. Review established department policy/procedure for preparing a intracavitary mold or surface applicator to receive radioactive sealed sources.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballon, S. (1981). Gynecologic oncology: Controversies in cancer treatment. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
3. Hendee, W. (1981). Radiation therapy physics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
5. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
7. Patient's chart/treatment plan.
8. Physician's/oncologist's request.
9. Positive mold or cast.
10. Fabrication tools and materials.
11. Checklist - Preparing intracavitary mold or surface applicator for radioactive sealed source.

TEACHING ACTIVITIES:

1. Discuss and demonstrate how to verify mold/cast identification and to check if it has cured completely. (* 1)
2. Review and show students how to measure mold/cast assembly and compare to original measurements. (* 1,2,3 & 9)
3. Discuss how to make adjustments to obtain true interplane distances. (* 3)
4. Discuss procedure for determining position, distances, lengths, angles, and number of nylon tubes needed to secure radioactive source to mold or applicator. (* 3,4,5 & 6)
5. Explain and show students how to determine location and arragnement of tubes on mold or applicator. (* 3,4,9 & 10)
6. Instruct and demonstrate how to machine or place grooves or guides for tube attachment on mold or applicator. (* 9 & 10)

TEACHING ACTIVITIES: (cont.)

7. Demonstrate how to seal one end of tubes using a heat crimping tool and how to attach tubes to grooves or guides. (* 2 & 10)
8. Conduct class discussion on the need for protective lead shielding. (*1,2,3,4,5 & 6)
9. Explain and demonstrate how to attach protective lead shields when appropriate. (* 2 & 10)
10. Explain to students how to cover mold or applicator with protective plastic cover until ready to insert radioactive sealed source. (* 1 & 6)
11. Review and show how to record procedure on treatment plan. (* 1,7 & 8)
12. Monitor students as they practice preparing intracavitary mold or surface applicator mold to receive radioactive sealed source. (* 7,8,9 & 10)
13. Supervise and evaluate students preparing intracavitary mold or surface applicator mold to receive radioactive sealed source. (* 11)

CRITERION-REFERENCED MEASURE:

The student must locate and verify patient's positive intracavitary mold or cast, verify positive mold/cast assembly to original measurements, determine tube needed to secure radioactive sealed source, make grooves on mold, seal tubes, attach protective shields, cover mold or applicator with a plastic bag, and record procedure in patient's chart.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Obtain positive intracavitary mold or cast.
3. Verify mold/cast identification and that it has cured (dried) completely.
4. Measure positive mold/cast assembly and compare to original measurements.
   NOTE: Adjustments may be needed to obtain true interplane distances.
5. Review position, distances, lengths, angles, and number of nylon tubes needed to secure radioactive source to mold or applicator.
6. Determine location and arrangement of tubes on mold or applicator.
7. Machine or place grooves or guides for tube attachment on mold or applicator.
8. Seal one end of tubes using a heat crimping tool and attach tubes to grooves or guides.

PERFORMANCE GUIDE: (cont.)

9. Attach protective lead shields when appropriate.
10. Cover mold or applicator with a protective plastic cover, until ready to insert radioactive sealed source.
11. Record procedure on treatment plan, including fabricator's name and date of fabrication.

CHECKLIST

DUTY Performing Support Services

TASK Prepare intracavitary mold or surface applicator mold to receive radioactive sealed sources.

ENABLER

1. Recall meaning and purpose of a intercavitary mold and a surface mold.
2. Locate radioactive sealed source to be used.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare intracavitary mold or surface applicator mold to receive radioactive sealed sources.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Verified physician's/oncologist's request.	______	______
2.	Obtained positive intracavitary mold or cast.	______	______
3.	Verified mold/cast identification and that it had cured (dried) completely.	______	______
4.	Measured positive mold/cast assembly and compared to original measurements.	______	______
5.	Reviewed position, distances, lengths, angles, and number of nylon tubes needed to secure radioactive source to mold or applicator.	______	______
6.	Determined location and arrangement of tubes on mold or applicator.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
7. Machined or placed grooves or guides for tube attachment on mold or applicator.	________	________
8. Sealed one end of tubes using a heat crimping tool and attached tubes to grooves or guides.	________	________
9. Attached protective lead shields when appropriate.	________	________
10. Covered mold or applicator with a protective plastic cover, until ready to insert radioactive sealed source.	________	________
11. Recorded procedure on treatment plan, including fabricator's name and date of fabrication.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 146

TASK: Prepare a solid cast for shaping lead shields.

STANDARD OF PERFORMANCE OF TASK:

Solid cast must provide a smooth, hard correctly shaped surface with guide marks for accurate shaping of lead shields. The procedure must be recorded on the radiation treatment plan including fabricator's name and fabrication date.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report # 9.

CONDITIONS FOR PERFORMANCE OF TASK:

Solid cast
Calipers
Protractor
Marking pens
Work bench
Radiation treatment plan
Physician's/oncologist's request
Fine abrasive tool (file, sandpaper, steel wool)

ENABLING OBJECTIVES:

1. Locate the solid cast to be used.
2. Assemble tools and materials needed to shape lead shields.
3. Review established department policy/procedure for preparing a solid cast from shaped lead shields.

***RESOURCES:**

1. Department policy/procedure match.
2. Bleck, E. (1974). Atlas of plaster cast techniques (2nd ed.). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES:** (cont.)

3. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
4. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Preprepared cast.
6. Fabrication supplies.
7. Radiation treatment tools and materials.
8. Fine abrasive tools.
9. Radiation treatment plan.
10. Patient's chart.
11. Checklist - Preparing a solid cast.

TEACHING ACTIVITIES:

1. Review procedure for identifying and obtaining cast. (* 1,5,9 & 10)
2. Instruct students on how to remove impression material from cast. (* 2,3,5 & 7)
3. Explain and show students how to check cast surface for rough spots, ridges and foreign materials. (* 2,3 & 5)
4. Instruct and demonstrate how to rub cast surface lightly with fine abrasive tool until smooth. (* 2,3,5 & 8)
5. Explain anbd show students how to set lead strip placement and apply surface markings on cast surface. (* 5,6 & 7)
6. Conduct class discussion on function and importance of lead strips. (* 2 & 3)
7. Review and show how to record procedure on treatment plan. (* 1,4,9 & 10)
8. Monitor students as they practice preparing solid casts for shaping lead shields. (* 5,6,7,8,9 & 10)
9. Supervise and evaluate students preparing solid casts for shaping lead shields. (* 11)

CRITERION-REFERENCED MEASURE:

The student must locate cast, remove impression material, check cast surface, determine lead strip placement, mark cast surface, and record procedure on treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's or onchologist's request.
2. Obtain cast and remove impression material.
3. Check cast surface for rough spots, ridges, and foreign materials.
4. Rub cast surface lightly with fine abrasive tool until cast surface is smooth.
5. Set lead strip placement and apply surface markings on cast surface.
6. Record procedure on treatment plan, including fabricator's name and date of fabrication.

CHECKLIST

DUTY Performing Support Services

TASK Prepare a solid cast for shaping lead shields.

ENABLER

1. Locate the solid cast to be used.
2. Assemble tools and materials needed to shape lead shields for preparing a solid cast from shaped lead shields.
3. Review established department policy/procedure.

STUDENT'S NAME____________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**_________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare a solid cast for shaping lead shields.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's or oncologist's request.		
2.	Obtained cast and removed impression material.		
3.	Checked cast surface for rough spots, ridges, and foreign materials.		
4.	Rubbed cast surface lightly with fine abrasive tool until cast surface is smooth.		
5.	Set lead strip placement and applied surface markings on cast surface.		
6.	Recorded procedure on treatment plan, including fabricator's name and date of fabrication.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 147

TASK: Form a plastic treatment shell, using vacuum forming machine.

STANDARD OF PERFORMANCE OF TASK:

Plastic radiotherapy treatment shell must be formed from a transparent plastic sheet, using a solid or positive cast and a vacuum forming machine. Formed treatment shell must be cut, trimmed, drilled, and assembled as indicated by treatment plan or oncologist. The procedure must be recorded on the radiation treatment plan, including fabricator's name and fabrication date.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report # 9.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's/oncologist's request
Radiation treatment plan
Vacuum forming machine
Solid/positive cast
Transparent plastic sheet (lucite, plexiglass)
Cutting/trimming tool
Drill
Separating agent (vaseline, oil, jelly)
Fine abrasive tool
Work bench

ENABLING OBJECTIVES:

1. Recall function of vacuum forming machine.
2. Recall tool, materials and supplies needed to form a plastic treatment shell.
3. Review physician's/oncologist's request.
4. Identify solid or positive cast to be used to form plastic treatment shell.
5. Review established department policy/procedures for forming a plastic treatment shell using a vacuum forming machine.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bleck, E. (1974). Atlas of plaster cast techniques (2nd ed.). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
3. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
4. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
6. Vacuum forming machine.
7. Solid/positive cast.
8. Transparent plastic sheet.
9. Fabrication tools and supplies.
10. Radiation treatment plan.
11. Checklist - Forming a plastic treatment shell, using a vacuum forming machine.

TEACHING ACTIVITIES:

1. Review procedure for obtaining solid or positive cast and verifying identification. (* 1,2,7 & 10)
2. Explain and demonstrate how to prepare cast for positive mold. (* 1,2,3,7 & 9)
3. Discuss types of separating agents and their function. (* 2 & 9)
4. Discuss and demonstrate the operation of a vacuum forming machine. (* 6)
5. Explain and demonstrate how to form treatment shell. (* 2,3 & 4)
6. Review and show students how to mark plastic treatment shell with identification information. (* 1,9 & 10)
7. Show students how to record procedure on treatment plan. (* 1,5 & 10)
8. Monitor students as they practice forming a plastic treatment shell using a vacuum forming machine. (* 6,7,8,9 & 10)
9. Supervise and evaluate students forming plastic treatment shells using a vacuum forming machine. (* 11)

CRITERION-REFERENCED MEASURE:

The student must verify identification of solid/positive cast, prepare cast for molding, position plastic sheet, operate vacuum forming machine, remove plastic treatment shell from cast, reassemble parts of shell, mark shell with identification information and record procedure on treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Obtain solid or positive cast and verify identification.
3. Prepare cast for positive mold:
   - A. Check cast surface for rough spots, ridges and foreign material.
   - B. Smooth cast surface, using fine abrasive tool.
   - C. Apply separating agent to cast surface.
   - D. Place cast in vacuum forming machine.
   - E. Select and place sheet of transparent plastic over cast.
4. Form treatment shell:
   - A. Close vacuum forming machine and heat plastic to forming temperature.
   - B. Introduce compressed air, until plastic forms a bubble around cast.
   - C. Create a vacuum, pulling heated plastic tightly over cast.
   - D. Release vacuum and use compressed air to release plastic shell from cast.
   - E. Remove shell and cast from vacuum forming machine and cut shell from sheet.
   - F. Remove shell from cast and trim.
     NOTE: It may be necessary to cut shell apart to remove from cast.
   - G. Reassemble shell parts, if necessary, and drill breathing and treatment holes as appropriate.
5. Mark plastic treatment shell with identification information.
6. Record procedure on treatment plan, including fabricator's name and date of fabrication.

CHECKLIST

DUTY Performing Support Services

TASK Form a plastic treatment shell, using vacuum forming machine.

ENABLER

1. Recall function of vacuum forming machine.
2. Recall tool, materials and supplies needed to form a plastic treatment shell.
3. Review physician's/oncologist's request.
4. Identify solid or positive cast to be used to form plastic treatment shell.

STUDENT'S NAME__________________________ **DATE**__________

EVALUATOR'S NAME__________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to form a plastic treatment shell, using vacuum forming machine.

PERFORMANCE DETERMINANTS	YES	NO
1. Verified physician's/oncologist's request.	______	______
2. Obtained solid or positive cast and verified identification.	______	______
3. Prepared cast for positive mold:		
- Checked cast surface for rough spots, ridges and foreign material.	______	______
- Smoothed cast surface, using fine abrasive tool.	______	______
- Applied separating agent to cast surface.	______	______
- Placed cast in vacuum forming machine.	______	______
- Selected and placed sheet of transparent plastic over cast.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
4. Formed treatment shell:		
- Closed vacuum forming machine and heated plastic to forming temperature.	________	________
- Introduced compressed air, until plastic formed a bubble around cast.	________	________
- Created a vacuum, pulling heated plastic tightly over cast.	________	________
- Released vacuum and used compressed air to release plastic shell from cast.	________	________
- Removed shell and cast from vacuum forming machine and cut shell from sheet.	________	________
- Removed shell from cast and trim.	________	________
- Reassembled shell parts, if necessary, and drilled breathing and treatment holes as appropriate.	________	________
5. Marked plastic treatment shell with identification information.	________	________
6. Recorded procedure on treatment plan, including fabricator's name and date of fabrication.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 148

TASK: Form an intraoral, surface stent, or dental wax impression of patient.

STANDARD OF PERFORMANCE OF TASK:

Intraoral, surface stent of wax impression must provide an exact mold or cast of patient's oral treatment area. The procedure must be recorded on the patient's chart and treatment plan, including fabricator's name and fabrication date.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Wax compound
Stent compound
Heated water bath
Dental support tray
Thermoplastic resin wax
Examination table/chair
Radiation treatment plan
Physician's/oncologist's request

ENABLING OBJECTIVES:

1. Recall and assemble tools, materials and supplies needed to form an intraoral, surface stent or dental wax impression.
2. Verify physician's/oncologist's request.
3. Review established department policy/procedures for forming intraoral surface stent or dental wax impression of patient.

***RESOURCES:**

1. Department policy/procedure manual.
2. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.

***RESOURCES:** (cont.)

3. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
4. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
6. Patient's chart.
7. Radiation treatment plan.
8. Wax and stent compound.
9. Thermoplastic resin wax.
10. Dental support tray.
11. Heated water bath.
12. Checklist - Forming intraoral, surface stent or dental wax impression of patient.

TEACHING ACTIVITIES:

1. Instruct students to review patient's treatment plan. (* 1,6 & 7)
2. Identify and assemble needed tools and materials for forming wax impressions. (* 2,3 & 4)
3. Explain and show students how to greet patients, verify patient I.D. and explain procedure to patient. (* 1,5,6 & 7)
4. Explain and demonstrate how to heat wax compound in water bath to appropriate composition. (* 2,3,4,8 & 11)
5. Instruct and show students how to measure patient and select dental support tray. (* 2 & 10)
6. Instruct and demonstrate how to fill support tray with heated thermosplastic resin wax. (* 2,3,4,8 & 10)
7. Explain and show students how to instruct patient to hold tray in mouth with wax against proposed treatment area until wax cools. (* 1,2,5 & 10)
8. Demonstrate how to remove tray from patient's mouth. (* 2,5 & 10)
9. Review and show how to attach identification information to wax cast or stent. (* 1,2 & 5)
10. Explain procedure for arranging for patient's return and dismissing patient. (* 1 & 5)
11. Review and demonstrate how to record procedures on patient's chart/treatment plan. (* 1,5,6 & 7)
12. Monitor students as they practice forming an intraoral, surface stent or dental wax impression of patient. (* 6,7,8,9,10 & 11)

TEACHING ACTIVITIES: (cont.)

13. Supervise and evaluate students forming an intraoral, surface stent or dental wax impression of patient. (* 12)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, heat wax compound in water bath, measure and select dental support tray, fill support tray with wax, position tray against treatment area, remove dental support tray, attach identification to wax cast or stent and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Review patient's radiation treatment plan and assemble needed tools and materials.
3. Greet patient, verify identification and explain procedure.
4. Heat wax compound in water bath to appropriate composition.
5. Measure patient and select dental support tray.
6. Fill support tray with heated thermoplastic resin wax.
7. Instruct patient to hold tray in mouth with wax pressing against proposed treatment area until cool.
8. Remove tray from patient's mouth and attach identification information to wax cast or stent.
9. Arrange for patient's return and dismiss patient.
10. Record procedure on patient's chart/treatment plan, including fabricator's name and date of fabrication.

CHECKLIST

DUTY Performing Support Services

TASK Form an intraoral, surface stent, or dental wax impression of patient.

ENABLER

1. Recall and assemble tools, materials and supplies needed to form an intraoral, surface stent, or dental wax impression.
2. Verify physician/oncologist's request.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to form an intraoral, surface stent, or dental wax impression of patient.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's/oncologist's request.		
2.	Reviewed patient's radiation treatment plan and assembled needed tools and materials.		
3.	Greeted patient, verified identification and explained procedure.		
4.	Heated wax compound in water bath to appropriate composition.		
5.	Measured patient and selected dental support tray.		
6.	Filled support tray with heated thermoplastic resin wax.		
7.	Instructed patient to hold tray in mouth with wax pressing against proposed treatment area until cool.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
8. Removed tray from patient's mouth and attached identification information to wax cast or stent.	______	______
9. Arranged for patient's return and dismissed patient.	______	______
10. Recorded procedure on patient's chart/treatment plan, including fabricator's name and date of fabrication.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 149

TASK: Fabricate a bite-block mold from a wax cast.

STANDARD OF PERFORMANCE OF TASK:

Plaster of Paris radiotherapy treatment bit block mold must be an exact duplicate of the wax cast. The procedure must be recorded on radiation treatment plan, including fabricator's name and fabrication date.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Water
Wax cast
Box mold
Work bench
Mixing basin
Plaster of Paris
Immersion stem/handle
Radiation treatment plan
Physician's/oncologist's request

ENABLING OBJECTIVES:

1. Locate wax cast to be used for bite-block mold.
2. Verify physician's/oncologist's request.
3. Recall tools and materials needed for fabricating a bite-block mold.
4. Assemble tools and materials for fabricating a bite-block mold.
5. Review established department policy/procedure for fabricating a bite-block mold from a wax cast.

***RESOURCES:**

1. Department policy/procedure manual.
2. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.

***RESOURCES:** (cont.)

3. Bleck, E. (1974). Atlas of plaster cast techniques (2nd ed.). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
6. Patient's chart/treatment plan.
7. Wax cast.
8. Box mold.
9. Immersion stem/handle.
10. Plaster of Paris.
11. Checklist - Fabricating a bite-block mold from a wax cast.

TEACHING ACTIVITIES:

1. Review procedure for obtaining wax cast and verifying identification. (* 1,6 & 7)
2. Explain and show students how to review radiation treatment plan. (* 1,5 & 6)
3. Instruct and show students how to prepare plaster of Paris mixture according to manufacturer's directions. (* 2,3 & 10)
4. Demonstrate how to pour plaster of Paris mixture into box mold. (* 3,8 & 10)
5. Explain and demonstrate how to attach immersion stem/handle to top of wax cast. (* 2,3,4,7 & 9)
6. Instruct and demonstrate how to immerse wax cast in plaster of Paris, except for top surface. (* 2,3,8 & 10)
7. Instruct students on how to secure wax cast in box mold until plaster of Paris dries. (* 3,7 & 10)
8. Explain and show students how to remove bite block mold from mold box when dry. (* 3 & 8)
9. Review and demonstrate how to attach identification information to bite block mold. (* 3 & 6)
10. Review and show students how to record procedure on radiation treatment plan. (* 1,5 & 6)
11. Monitor students as they practice fabricating bite-block molds from wax casts. (* 6,7,8,9 & 10)
12. Supervise and evaluate students fabricating bite-block molds from wax casts. (* 11)

CRITERION-REFERENCED MEASURE:

The student must verify wax cast identification, prepare plaster of Paris, pour plaster of Paris in box mold, attach immersion stem/handle to wax cast, immerse wax cast in plaster of Paris, remove bite block mold from box, attach identification and record procedure on treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Obtain wax cast and verify identification.
3. Review radiation treatment plan.
4. Prepare plaster of Paris mixture in mixing bowl, according to manufacturer's directions.
5. Pour plaster of Paris mixture into box mold.
6. Attach immersion stem/handle to top of wax cast.
7. Immerse wax cast in plaster of Paris mixture, except for top surface.
8. Secure wax cast in box mold until plaster of Paris dries.
9. Remove bite block mold from mold box when completely dry.
10. Attach identification information to bite block mold.
11. Record procedure on radiation treatment plan, including fabricator's name and date of fabrication.

CHECKLIST

DUTY Performing Support Services

TASK Fabricate a bite-block mold from a wax cast.

ENABLER

1. Locate wax cast to be used for bite-block mold.
2. Verify physician's/oncologist's request.
3. Recall tools and materials needed for fabricating a bite-block mold.
4. Assemble tools and materials for fabricating a bite-block mold.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to fabricate a bite-block mold from a wax cast.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's/oncologist's request.		
2.	Obtained wax cast and verified identification.		
3.	Reviewed radiation treatment plan.		
4.	Prepared plaster of Paris mixture in mixing bowl, according to manufacturer's directions.		
5.	Poured plaster of Paris mixture into box mold.		
6.	Attached immersion stem/handle to top of wax cast.		
7.	Immersed wax cast in plaster of Paris mixture, except for top surface.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
8. Secured wax cast in box mold until plaster of Paris dried.	________	________
9. Removed bite block mold from mold box when completely dry.	________	________
10. Attached identification information to bit block mold.	________	________
11. Recorded procedure on radiation treatment plan, including fabricator's name and date of fabrication.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 150

TASK: Prepare a lead bite-block from a wax cast set in plaster mold.

STANDARD OF PERFORMANCE OF TASK:

Fabricated lead bite-block must exactly match the wax cast set in plaster mold. The procedure must be recorded on the radiation treatment plan, including fabricator's name and fabrication date.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Task In Radiation Therapy And Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Lead strips
Melting ladle
Work bench
Radiation treatment plan
Wax cast set in plaster mold
Physician's/oncologist's request
Heat source (stove, burner, hot plate)

ENABLING OBJECTIVES:

1. Recall tools and materials needed to prepare a lead bite-block from a wax cast set in plaster mold.
2. Assemble tools and materials needed.
3. Verify physicians/oncologists request.
4. Locate wax cast set in plaster mold.
5. Review established department policy/procedure for preparing a bite-block from a wax cast set in plaster mold.

***RESOURCES:**

1. Department policy/procedure manual.
2. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.

***RESOURCES:** (cont.)

3. Bleck, E. (1974). Atlas of plaster cast techniques (2nd ed.). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
6. Radiation treatment plan/patient's chart.
7. Wax cast in plaster mold.
8. Heat source and melting ladle.
9. Lead strips.
10. Checklist - Preparing a lead bite-block from wax cast in plaster mold.

TEACHING ACTIVITIES:

1. Review procedure for obtaining wax cast set and verifying identification. (* 1,5, & 6)
2. Explain and show students how to check that plaster mold has hardened completely. (* 2 & 3)
3. Instruct and demonstrate how to invert wax-plaster cast over heat and allow wax to melt and run out of plaster mold. (* 2,3 & 8)
4. Show students how to remove plaster cast from heat and let cool. (* 2,3,7 & 8)
5. Explain and show students how to liquify lead. (* 2,3,4,8 & 9)
6. Instruct and show how to pour melted lead into cast. (* 2,3 & 4)
7. Demonstrate how to break plaster cast after lead is cool. (* 7)
8. Review and show how to label lead bite-block with identification information. (* 1,5 & 8)
9. Explain and show students how to record procedures on radiation treatment plan. (* 1,2,5 & 6)
10. Monitor students as they practice preparing lead bite-blocks from wax casts set in plaster molds. (* 6,7,8 & 9)
11. Supervise and evaluate students preparing lead bite-blocks from wax casts set in plaster molds. (*10)

CRITERION-REFERENCED MEASURE:

The student must verify wax cast in plaster mold, melt wax from plaster mold, melt lead and pour in cast, remove plaster cast from cooled lead, attach identification information to lead bite block and record procedure on radiation treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/ oncologist's request.
2. Obtain wax cast set in plaster mold and verify identification.
3. Verify that plaster mold has hardened completely.
4. Invert wax-plaster cast over heat and allow wax to melt and run out of plaster mold.
5. Remove plaster cast from heat and let cool.
6. Place lead strips in melting ladle and heat until lead liquefies.
7. Place plaster cast upright and pour in melted lead until cast is full.
8. Allow lead to cool to touch.
9. Break plaster cast, taking care not to damage lead bite-block.
10. Attach identification information on lead bite-block.
11. Record procedure on radiation treatment plan, including fabricator's name and date of fabrication.

CHECKLIST

DUTY Performing Support Services

TASK Prepare a lead bite-block from a wax cast set in plaster mold.

ENABLER

1. Recall tools and materials needed to prepare a lead bite-block from a wax cast set in plaster mold.
2. Assemble tools and materials needed.
3. Verify physician's/oncologist's request.
4. Locate wax cast set in plaster mold.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare a lead bite-block from a wax cast set in plaster mold.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Verified physician's/ oncologist's request.	______	______
2.	Obtained wax cast set in plaster mold and verified identification.	______	______
3.	Verified that plaster mold had hardened completely.	______	______
4.	Inverted wax-plaster cast over heat and allowed wax to melt and run out of plaster mold.	______	______
5.	Removed plaster cast from heat and let cool.	______	______
6.	Placed lead strips in melting ladle and heated until lead liquefied.	______	______
7.	Placed plaster cast upright and poured in melted lead until cast was full.	______	______
8.	Allowed lead to cool to touch.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Broke plaster cast, taking care not to damage lead bite-block.	______	______
10. Attached identification information on lead bite-block.	______	______
11. Recorded procedure on radiation treatment plan, including fabricator's name and date of fabrication.	______	______

PERFORMANCE OBJECTIVE NO. 151

TASK: Apply bolus to treatment shell.

STANDARD OF PERFORMANCE OF TASK:

Wax bolus must be applied to the entire inside surface of the treatment shell. Bolus must prevent contact of patient's skin and treatment shell surface. Procedure must be recorded on radiation treatment plan, including fabricator's name and date of fabrication.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Task In Radiation And Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Beeswax
Work bench
Cardboard
Rods
Spatula
Fabricated treatment shell
Physician's/oncologist's request
Radiation therapy treatment plan

ENABLING OBJECTIVES:

1. Recall purpose of applying bolus to treatment shell.
2. Recall tools and materials needed to apply bolus to a treatment shell.
3. Assemble tools and materials needed to apply bolus to treatment shell.
4. Review established department procedure for applying bolus to a treatment shell.

***RESOURCES:**

1. Department policy/procedure manual.
2. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.

***RESOURCES:** (cont.)

3. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
4. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
6. Patient's chart/treatment plan.
7. Fabricated treatment plan.
8. Fabrication tools and materials.
9. Beeswax.
10. Checklist - Applying bolus to treatment shell.

TEACHING ACTIVITIES:

1. Review and show students how to obtain pre-fabricated treatment shell and verify identification (* 1,5,6 & 7)
2. Show students how to check that portal and treatment markings have been made on shell. (* 6 & 7)
3. Explain and demonstrate how to create reproduction of treatment plan on cardboard and fit in shell at tumor plane. (* 2,3,4 & 7)
4. Demonstrate how to pass a rod through the shell along center axis of each beam. (* 7 & 8)
5. Explain and show students how to make a wood model of portal plane and perforate in center. (* 2)
6. Instruct and demonstrate how to attach director at right angles and place model on rod in contact with shell surface. (* 2,3 & 7)
7. Demonstrate how to melt beeswax and pour into air space between portal model and shell. (* 2,3,7,8 & 9)
8. Show students how to dry and trim wax edges with warm spatula. (* 7 & 8)
9. Instruct and demonstrate how to remove rod, portal model, and cardboard from treatment shell. (* 2 & 3)
10. Explain and show students how to inspect inside of treatment shell for a complete, uniform coating of wax. (* 2,3 & 7)
11. Review and demonstrate how to record procedure on radiation treatment plan. (* 1,5 & 6)
12. Monitor students as they practice applying bolus to treatment shell. (* 6,7,8 & 9)
13. Supervise and evaluate students applying bolus to treatment shell. (* 10)

CRITERION-REFERENCED MEASURE:

The student must locate fabricated treatment shell, verify portal and treatment markings, create portal model, fit model inside treatment shell, pour melted beeswax between model and shell, trim wax edges, inspect inside of shell for uniform coat of wax and record procedure on radiation treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Obtain pre-fabricated treatment shell and verify identification.
3. Check that portal and treatment markings have been made on shell.
4. Create reproduction of treatment plan on cardboard and fit in shell at tumor plane.
5. Pass a rod through the shell along center axis of each beam.
6. Make a wood model of portal plane and perforate in center.
7. Attach director at right angles and place model on rod in contact with shell surface.
8. Melt beeswax and pour into air space between portal model and shell.
9. Dry and trim wax edges with a warm spatula.
10. Remove rod, portal model, and cardboard from treatment shell.
11. Inspect inside of treatment shell for a complete, uniform coating of wax.
12. Record procedure on radiation treatment plan, including fabricator's name and date of fabrication.

CHECKLIST

DUTY Performing Support Services

TASK Apply bolus to treatment shell.

ENABLER

1. Recall purpose of applying bolus to treatment shell.
2. Recall tools and materials needed to apply bolus to a treatment shell.
3. Assemble tools and materials needed to apply bolus to treatment shell.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to apply bolus to treatment shell.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Verified physician's/oncologist's request.	______	______
2. Obtained pre-fabricated treatment shell and verified identification.	______	______
3. Checked that portal and treatment markings had been made on shell.	______	______
4. Created reproduction of treatment plan on cardboard and fit in shell at tumor plane.	______	______
5. Passed a rod through the shell along center axis of each beam.	______	______
6. Made a wood model of portal plane and perforated in center.	______	______
7. Attached director at right angles and placed model on rod in contact with shell surface.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
8. Melted beeswax and poured into air space between portal model and shell.	________	________
9. Dried and trimmed wax edges with a warm spatula.	________	________
10. Removed rod, portal model, and cardboard from treatment shell.	________	________
11. Inspected inside of treatment shell for a complete, uniform coating of wax.	________	________
12. Recorded procedure on radiation treatment plan, including fabricator's name and date of fabrication.	________	________

PERFORMANCE OBJECTIVE NO. 152

TASK: Fabricate lead shielding for treatment fields.

STANDARD OF PERFORMANCE OF TASK:

Lead treatment shields of prescribed thickness and size must be cut, laminated, and bound together to protect patient area from unwanted radiation. Procedure must be recorded on treatment plan, including fabricator's name and date of fabrication.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Task In Radiation And Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Solder
Adhesive
Sheet lead
Solder gun
Work bench
Treatment template
Laminating material
Physician's/oncologist's request
Radiation therapy treatment plan

ENABLING OBJECTIVES:

1. Identify treatment areas needing lead shielding.
2. Recall and assemble tools and materials needed to fabricate lead shielding.
3. Review established department procedure for fabricating lead shielding.

***RESOURCES:**

1. Department policy/procedure manual.
2. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.

***RESOURCES:** (cont.)

3. Hendee, W. (1981). Radiation therapy physics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
6. Treatment template.
7. Radiation treatment plan/patient`s chart.
8. Laminating materials.
9. Fabrication tools and materials.
10. Checklist - Fabricating lead shielding.

TEACHING ACTIVITIES:

1. Review and show how to obtain a tracing of the area to be shielded. (* 1,2)
2. Explain and demonstrate how to create cutting template and cut out.
3. Discuss and demonstrate how to determine the number of layers of sheet lead foil required to provide prescribed HVL. (* 1,2,4 & 7)
4. Show students how to cut out slabs of sheet lead, using the templates and shears. (* 2,3,6, & 9)
5. Explain and show how to laminate the lead layers. (* 8 & 9)
6. Demonstrate how to bind the lead layers together using solder or adhesive. (* 2 & 9)
7. Review and show how to place identification information on the fabricated shield. (* 1,2,5 & 7)
8. Review how to record procedure on radiation therapy treatment plan. (* 1,5 & 7)
9. Monitor students as they practice fabricating lead shielding for treatment fields. (* 6,7,8 & 9)
10. Supervise and evaluate students fabricating lead shielding for treatment fields. (* 10)

CRITERION-REFERENCED MEASURE:

The student must create a cutting template, determine thickness of lead required, cut lead sheets, laminate lead layers, bind lead layers together, place identification information on lead shield and record procedure on radiation treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Obtain tracing of area to be shielded.
3. Create cutting template and cut out.
4. Determine the number of layers of sheet lead foil required to provide prescribed HVL.
5. Cut out slabs of sheet lead, using the templates and shears.
6. Laminate the lead layers.
7. Bind the lead layers together, using solder or adhesive.
8. Place identification information on the fabricated lead shield.
9. Record procedure on radiation therapy treatment plan, including fabricator's name and date of fabrication.

CHECKLIST

DUTY Performing Support Services

TASK Fabricate lead shielding for treatment fields.

ENABLER

1. Identify treatment areas needing lead shielding.
2. Recall and assemble tools and materials needed to fabricate lead shielding.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to fabricate lead shielding for treatment fields.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's/oncologist's request.	______	______
2.	Obtained tracing of area to be shielded.	______	______
3.	Created cutting template and cut out.	______	______
4.	Determined the number of layers of sheet lead foil required to provide prescribed HVL.	______	______
5.	Cut out slabs of sheet lead, using the templates and shears.	______	______
6.	Laminated the lead layers.	______	______
7.	Bound the lead layers together, using solder or adhesive.	______	______
8.	Placed identification information on the fabricated lead shield.	______	______
9.	Recorded procedure on radiation therapy treatment plan, including fabricator's name and date of fabrication.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 153

TASK: Fabricate lead shielding on a plaster cast of patient.

STANDARD OF PERFORMANCE OF TASK:

Lead sheets of prescribed thickness and shape must be cut, laminated and beaten to conform to a plaster cast of the patient's treatment area, forming a treatment shield. The shield must protect patient from radiation in all but the designated treatment area. The procedures must be recorded on treatment plan including fabricator's name and fabrication date.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Solder
Solder gun
Adhesive
Work bench
Sheet lead
Metal shears
Ballpeen hammer
Treatment templates
Laminating material
Prefabricated treatment cast
Physician's/oncologist's request
Radiation therapy treatment plan

ENABLING OBJECTIVES:

1. Locate plaster cast that lead shielding is to be fabricated from.
2. Verify physician's/oncologist's request.
3. Recall and assemble tools and materials needed to fabricate lead shielding.
4. Review established department procedure for fabricating lead shielding on a plaster cast.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bleck, E. (1974). Atlas of plaster cast techniques (2nd ed.). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
3. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.
4. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
6. Fabrication tools and materials.
7. Treatment templates
8. Laminating material.
9. Prefabricated treatment cast.
10. Radiation treatment plan/patient chart.
11. Checklist - Fabricating lead shielding from a plaster cast.

TEACHING ACTIVITIES:

1. Review how to obtain prefabricated treatment cast and verify identification. (* 1,5 & 10)
2. Discuss how to check that cast has hardened. (* 2 & 3)
3. Explain and show how to check cast for portal and shielding outline marks. (* 2,3 & 9)
4. Instruct and demonstrate how to cut lead sheets to templates for coverage of contour areas. (* 2,3 & 6)
5. Review and demonstrate how to cut lead sheets to template patterns. (* 2,3 & 7)
6. Show students how to smooth cut edges and laminate the lead sheets. (* 2,3,4,6 & 8)
7. Instruct and demonstrate how to position lead sheets on cast treatment outlines. (* 2,3,6,7 & 8))
8. Demonstrate how to beat lead sheets with ballpeen hammer to conform to contour of treatment cast. (* 3,6 & 9)
9. Explain and demonstrate how to burnish lead sheets for close fit and cut apertures as specified. (* 2,3 & 6)
10. Review and show how to smooth edges and join pieces by soldering or adhesive. (* 1,2,3 & 6)

TEACHING ACTIVITIES: (cont.)

11. Show students how to replace lead shield on cast to verify fit. (* 3 & 9)
12. Instruct and demonstrate how to coat shield with finishing material and allow it to dry. (* 3 & 6)
13. Review and show how to place identification information on shield and store. (* 1,5 & 10)
14. Review and demonstrate how to record procedure on radiation therapy treatment plan. (* 1,5 & 10)
15. Monitor students as they practice fabricating lead shielding on a plaster cast of patient. (* 6,7,8,9 & 10)
16. Supervise and evaluate students fabricating lead shielding on a plaster cast of patient. (* 11)

CRITERION-REFERENCED MEASURE:

The student must verify identification of prefabricated treatment shell, check for portal and shielding marks, create templates, cut lead sheets, smooth cut edges, laminate lead sheets, beat lead sheets to fit cast, burnish lead sheets, join lead sheets, fit fabricate shield on cast, coat shield with finishing material, place identification information on shield and record procedure on radiation treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Obtain prefabricated treatment cast and verify identification and that cast has hardened.
3. Check cast for portal and shielding outline marks.
4. Create templates for coverage of contour areas.
5. Cut lead sheets to template patterns.
6. Smooth cut edges and laminate the lead sheets.
7. Position lead sheets on cast treatment outlines.
8. Beat lead sheets with ballpeen hammer to conform to contours of treatment cast.
9. Burnish lead sheets for close fit and cut apertures as specified.
10. Smooth edges and join pieces by soldering or with adhesive.
11. Replace lead shield on cast to verify fit.
12. Coat shield with finishing material and allow it to dry.

CHECKLIST

DUTY Performing Support Services

TASK Fabricate lead shielding on a plaster cast of patient.

ENABLER

1. Locate plaster cast that lead shielding is to be fabricated from.
2. Verify physician's/oncologist's request.
3. Recall and assemble tools and materials needed to fabricate lead shielding.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to fabricate lead shielding on a plaster cast of patient.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's/oncologist's request.		
2.	Obtained prefabricated treatment cast and verified identification and that cast had hardened.		
3.	Checked cast for portal and shielding outline marks.		
4.	Created templates for coverage of contour areas.		
5.	Cut lead sheets to template patterns.		
6.	Smoothed cut edges and laminated the lead sheets.		
7.	Positioned lead sheets on cast treatment outlines.		
8.	Beat lead sheets with ballpeen hammer to conform to contours of treatment cast.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Burnished lead sheets for close fit and cut apertures as specified.	________	________
10. Smoothed edges and joined pieces by soldering or with adhesive.	________	________
11. Replaced lead shield on cast to verify fit.	________	________
12. Coated shield with finishing material and allowed it to dry.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 154

TASK: Cut treatment portals out of treatment shell.

STANDARD OF PERFORMANCE OF TASK:

Treatment portals must be cut in completed treatment shell so as to allow radiation dose to be received in the designated treatment areas only.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Workbench
Cutting tools
Completed treatment shell
Physician's/oncologist's request
Radiation therapy treatment plan

ENABLING OBJECTIVES:

1. Verify identification of treatment shell to have portals cut out.
2. Recall and assemble tools and materials needed to cut treatment portals in shell.
3. Review established department procedure for cutting treatment portals from treatment shell.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bleck, E. (1974). Atlas of plaster cast techniques (2nd ed.). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
3. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.
4. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

6. Pre-fabricated treatment shell.
7. Cutting tools.
8. Radiation treatment plan.
9. Checklist - Cutting treatment portals in treatment shell.

TEACHING ACTIVITIES:

1. Review how to obtain completed treatment shell and verify identification. (* 1,5 & 8)
2. Conduct class discussion on checking portal and treatment marking and verifying positioning with treatment plan. (* 2,3,4 & 8)
3. Review and explain how to cut out indicated areas using appropriate cutting tools. (* 2,3,6 & 7)
4. Explain and demonstrate how to smooth cut edges. (* 2,3 & 6)
5. Review and show how to place identification information on treatment shell. (* 1,5,6 & 8)
6. Identify procedure and demonstrate how to recheck treatment shell fitting and portal alignment on patient. (* 6 & 8)
7. Demonstrate how to record procedure on radiation therapy treatment plan. (* 1,5 & 8)
8. Monitor students as they practice cutting treatment portals out of treatment shell. (* 6,7 & 8)
9. Supervise and evaluate students cutting treatment portals out of treatment shell. (* 9)

CRITERION-REFERENCED MEASURE:

The student must verify treatment shell, identify portal and treatment markings, cut out portals, smooth portal edges, verify shell fit and portal alignment on patient and record procedure on radiation treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Obtain completed treatment shell and verify identification.
3. Check that portal and treatment markings have been made on the shell and verify positioning with treatment plan.
4. Cut out indicated areas using appropriate cutting tools.
5. Smooth cut edges.

PERFORMANCE GUIDE: (cont.)

6. Place identification information on treatment shell.
7. Recheck treatment shell fitting and portal alignment on patient.
8. Record procedure on radiation therapy treatment plan.

CHECKLIST

DUTY Performing Support Services

TASK Cut treatment portals out of treatment shell.

ENABLER

1. Verify identification of treatment shell to have portals cut out.
2. Recall and assemble tools and materials needed to cut treatment portals in shell.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to cut treatment portals out of treatment shell.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's/oncologist's request.	_____	_____
2.	Obtained completed treatment shell and verified identification.	_____	_____
3.	Checked that portal and treatment marking had been made on the shell and verified positioning with treatment plan.	_____	_____
4.	Cut out indicated areas using appropriate cutting tools.	_____	_____
5.	Smoothed cut edges.	_____	_____
6.	Placed identification information on treatment shell.	_____	_____
7.	Rechecked treatment shell fitting and portal alignment on patient.	_____	_____
8.	Recorded procedure on radiation therapy treatment plan.	_____	_____

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 155

TASK: Fabricate contact (spatula-type) internal eye shield.

STANDARD OF PERFORMANCE OF TASK:

Fabricated internal eye shield must protect the patient's eye from all unwanted radiation. The fabrication procedure must be recorded on the radiation therapy treatment plan, including fabricator's name and fabrication date.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's/oncologist's request
Radiation therapy treatment plan
Optical measurement tools
Lead-alloy material
Plastic shell
Eye shield casting/mold
Ballpeen hammer
Forceps
Nylon ties
Non-toxic polyethylene coating material
Sterilizing solution
Workbench

ENABLING OBJECTIVES:

1. Review patient's radiation treatment plan.
2. Identify tools and materials needed to fabricate internal eye shield.
3. Assemble tools and materials for fabricating internal eye shield.
4. Review established department policy/procedure for fabricating internal eye shields.

***RESOURCES:**

1. Department policy/procedure manual.
2. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.
3. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
4. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
6. Optical measurement tools.
7. Eye shield casting/mold.
8. Lead-alloy materials.
9. Non-toxic polyethylene coating.
10. Sterilizing solution.
11. Fabrication tools.
12. Radiation treatment plan/patient's chart.
13. Checklist - Fabricating contact internal eye shield.

TEACHING ACTIVITIES:

1. Instruct students on how to verify physician's/oncologist's request and review radiation treatment plan. (* 1,5 & 12)
2. Identify and demonstrate how to verify dimension of corneal radii. (* 2,3,4 & 6)
3. Explain and demonstrate how to prepare contact type internal eye shield. (* 2,7,8 & 9)
4. Explain and demonstrate how to prepare spatual type internal eye shield. (* 2,7,8,9 & 11)
5. Show students how to place shields in sterilizing solutions. (* 2 & 10)
6. Instruct and demonstrate how to place identification information and right and left markings on eye shields. (* 4,5 & 12)
7. Discuss and show students how to verify that internal eye shield fit on patient prior to treatment. (* 1,5 & 12)
8. Review and demonstrate how to record fabrication procedure on radiation therapy treatment plan. (* 1,5 & 12)

TEACHING ACTIVITIES: (cont.)

9. Monitor students as they practice fabricating contact and spatula internal eye shields. (* 6,7,8,9,10,11 & 12)
10. Supervise and evaluate students fabricating contact and spatula internal eye shields. (* 13)

CRITERION-REFERENCED MEASURE:

The student must verify dimensions of corneal radii, prepare internal eye shield, place shields in sterilizing solution, mark shield with right and left and identification information, verify fit prior to treatment, and record procedure on radiation treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Review radiation treatment plan.
3. Verify dimensions of corneal radii (at right angles).
4. Prepare internal eye shield:
    A. Contact shield:
        1. Prepare lead-alloy casting to fit standard size radii, including removal peg in center.
        2. Line lead shield with plastic shell.
        3. Peen edges of shield and seal.
        4. Handle shield with forceps.
           NOTE: Care must be taken when handling the contact, so as not to scratch the soft lead.
    B. Spatula shield:
        1. Select lead shielding of appropriate width to fit the two right angle dimensions.
        2. Form small handle at one end and drill hole for nylon tie.
        3. Cut, shape, trim, and burnish lead.
        4. Attach nylon tie to shield.
        5. Seal shield with non-toxic polyethylene coating.
5. Place shields in sterilizing solution.
6. Place identification information and right and left markings on eye shields.
7. Verify internal eye shield fit on patient prior to administration of radiation treatment.
8. Record fabrication procedure on radiation therapy treatment plan, including fabricator's name and date of fabrication.

CHECKLIST

DUTY Performing Support Services

TASK Fabricate contact (spatuala-type) internal eye shield.

ENABLER

1. Review patient's radiation treatment plan.
2. Identify tools and materials needed to fabricate internal eye shield.
3. Assemble tools and materials for fabricating internal eye shield.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to fabricate contact (spautla-type) internal eye shield.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's/oncologist's request.		
2.	Reviewed radiation treatment plan.		
3.	Verified dimensions of corneal radii (at right angles).		
4.	Prepared internal eye shield.		
5.	Prepared lead-alloy casting to fit standard size radii, including removal peg in center.		
6.	Lined lead shield with plastic shell.		
7.	Peened edges of shield and sealed.		
8.	Handled shield with forceps.		
9.	Selected lead shielding of appropriate width to fit the two right angle dimensions.		
10.	Formed small handle at one end and drilled hole for nylon tie.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
11.	Cut, shaped, trimmed, and burnished lead.		
12.	Attached nylon tie to shield.		
13.	Sealed shield with non-toxic polyethylene coating.		
14.	Placed shields in sterilizing solution.		
15.	Placed identification information and right and left markings on eye shields.		
16.	Verified internal eye shield fit on patient prior to administration of radiation treatment.		
17.	Recorded fabrication procedure on radiation therapy treatment plan, including fabricator's name and date of fabrication.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 156

TASK: Fit treatment shell to patient.

STANDARD OF PERFORMANCE OF TASK:

Angle boards, supporters, holders, shapers, and wedges must be attached to the treatment shell, so the finished shell fits only with patient aligned in the correct treatment position.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report # 9.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient
Supports
Holders
Shapers
Angle boards
Foam wedges
Fabricated treatment shell
Physician's/oncologist's request
Radiation therapy treatment plan

ENABLING OBJECTIVES:

1. Locate patient treatment shield.
2. Recall correct positioning of treatment shield.
3. Assemble treatment shell positioning equipment.
4. Review established department procedure for fitting treatment shell to patient.

***RESOURCES:**

1. Department policy/procedure manual.
2. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.
3. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, techniques, and results (6th ed.). St. Louis, MO: C.V. Mosby Company.

*RESOURCES: (cont.)

4. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
6. Fabricated treatment shell.
7. Treatment shell positioning equipment.
8. Patient.
9. Radiation treatment plan/patient chart.
10. Checklist - Fitting treatment shell to patient.

TEACHING ACTIVITIES:

1. Review how to obtain treatment shell and verify identification. (* 1,5 & 9)
2. Explain and show students how to greet patient, verify identification and explain procedure to patient. (* 1,3,5 & 9)
3. Review and show students how to assist patient onto simulation table. (* 1,4,5,8 & 9)
4. Conduct class discussion on how to position patient according to planned treatment area. (* 1,5,8 & 9)
5. Explain and demonstrate how to place treatment shell in place and attach angle boards, supports, holders, shapers, and wedges to obtain designated angulation and position. (* 2,3,6 & 7)
6. Instruct and demonstrate how to draw in alignment marks. (* 2 & 6)
7. Explain and show students how to verify position of attachments and permanently affix them to the shell. (* 2,6 & 7)
8. Demonstrate how to attach straps to fasten shell to holders and/or treatment table. (* 2 & 7)
9. Review and demonstrate how to recheck shell fitting to patient and to make adjustments as required. (* 1,2,3,6 & 8)
10. Review and show how to place identification information on treatment shell. (* 1,5 & 9)
11. Review how to record procedures and fitting notes on radiation treatment plan. (* 1,2,5 & 9)
12. Monitor students as they practice fitting treatment shell to patient. (* 6,7,8 & 9)
13. Supervise and evaluate students fitting treatment shell to patient. (* 10)

CRITERION-REFERENCED MEASURE:

The student must verify patient and treatment shell identification, explain procedure to patient, position patient in planned treatment position, position treatment shell, draw alignment marks, permanently attach fasteners to treatment shell, attach straps to holders, recheck treatment shell fit, place identification information on shell and record procedure on radiation treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Review radiation therapy treatment plan.
3. Obtain treatment shell and verify identification.
4. Greet patient, verify identification, and reassure patient about procedure.
5. Assist patient onto simulation table.
6. Position patient in planned treatment position.
7. Place treatment shell in place and attach angle boards, supports, holders, shapers, and wedges to obtain designated angulation and position.
8. Draw in alignment marks.
9. Verify position of attachments and permanently affix them to the shell.
10. Attach straps to fasten shell to holders and/or treatment table.
11. Recheck shell fitting to patient and make adjustments as required.
12. Place identification information on treatment shell.
13. Record procedure and fitting notes on radiation treatment plan.

CHECKLIST

DUTY Performing Support Services

TASK Fit treatment shell to patient.

ENABLER

1. Locate patient treatment shield.
2. Recall correct positioning of treatment shield.
3. Assemble treatment shell positioning equipment.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to fit treatment shell to patient.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's/oncologist's request.		
2.	Reviewed radiation therapy treatment plan.		
3.	Obtained treatment shell and verified identification.		
4.	Greeted patient, verified identification, and reassured patient about procedure.		
5.	Assisted patient onto simulation table.		
6.	Positioned patient in planned treatment position.		
7.	Placed treatment shell in place and attached angle boards, supports, holders, shapers, and wedges to obtain designated angulation and position.		
8.	Drew in alignment marks.		
9.	Verified position of attachments and permanently affixed them to the shell.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
10.	Attached straps to fasten shell to holders and/or treatment table.	________	________
11.	Rechecked shell fitting to patient and made adjustments as required.	________	________
12.	Placed identification information on treatment shell.	________	________
13.	Recorded procedure and fitting notes on radiation treatment plan.	________	________

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 157

TASK: Prepare external beam blocks of prescribed shapes for use in shadow tray.

STANDARD OF PERFORMANCE OF TASK:

External beam blocks must be arranged in the desired shape and thickness, so as to provide the various designated radiation dosages to the identified treatment areas. Assembly instructions must be recorded on the radiation therapy treatment plan.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's/oncologist's request
Radiation therapy treatment plan
Verification films of block arrangements
External beam blocks
Block placement device (platform, plate, tray)
Treatment simulation machine

ENABLING OBJECTIVES:

1. Review patient's radiation treatment plan.
2. Recall purpose of external beam blocks.
3. Identify shapes and sizes of external beam blocks needed.
4. Locate beam blocks needed for shadow tray.
5. Review established department policy/procedure for preparing beam blocks for use in shadow tray.

***RESOURCES:**

1. Department policy/procedure manual.
2. U.S. Department of Labor. (1977). Fields related to Radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.

***RESOURCES:** (cont.)

3. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
4. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Verification films of block arrangement.
6. Block placement device.
7. External beam blocks.
8. Treatment simulation machine.
9. Radiation treatment plan/patient's chart.
10. Checklist - Preparing external beam blocks for use in shadow box.

TEACHING ACTIVITIES:

1. Explain and show students how to review verification films for block arrangement. (* 1,2,5 & 9)
2. Demonstrate procedure for obtaining external beam blocks of various sizes and shapes. (* 1,2,3 & 7)
3. Explain and demonstrate how to arrange blocks on placement device replicating desired blocked area HVL and shapes. (* 2,3,4,6 & 7)
4. Show students how to cut blocks to obtain exact replication. (* 2 & 7)
5. Instruct and demonstrate how to secure blocks in position. (* 2,6,7 & 8)
6. Explain and show students how to write assembly instructions on radiation therapy treatment plan. (* 1 & 9)
7. Monitor students as they practice preparing external beam blocks of prescribed shapes for use in shadow tray. (* 5,6,7,8 & 9)
8. Supervise and evaluate students preparing external beam blocks of prescribed shapes for use in shadow tray. (* 10)

CRITERION-REFERENCED MEASURE:

The student must review verification films, obtain beam blocks of specified shape and thickness, arrange blocks in shadow tray, secure blocks in position and record assembly instructions on radiation treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Review verification films for block arrangement.
3. Obtain external beam blocks of various sizes and shapes.
4. Arrange blocks on placement device replicating desired blocked area HVL and shapes.
   NOTE: Some blocks may need to be cut to obtain exact replication.
5. Secure blocks in position.
6. Write assembly instructions on radiation therapy treatment plan.

CHECKLIST

DUTY Performing Support Services

TASK Prepare external beam blocks of prescribed shapes for use in shadow tray.

ENABLER

1. Review patient's radiation treatment plan.
2. Recall purpose of external beam blocks.
3. Identify shapes and sizes of external beam blocks needed.
4. Locate beam blocks needed for shadow tray.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to prepare external beam blocks of prescribed shapes for use in shadow tray.

PERFORMANCE DETERMINANTS	YES	NO
1. Verified physician's/oncologist's request.		
2. Reviewed verification films for block arrangement.		
3. Obtained external beam blocks of various sizes and shapes.		
4. Arranged blocks on placement device replicating desired blocked area HVL and shapes.		
5. Secured blocks in position.		
6. Wrote assembly instructions on radiation therapy treatment plan.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 158

TASK: Fabricate styrofoam molds for beam blocking.

STANDARD OF PERFORMANCE OF TASK:

Styrofoam block must be marked, cut, and shaped according to marked radiographs and treatment geometry, so when filled with lead the desired lead beam block is formed. Fabrication procedure must be recorded on radiation therapy treatment plan, including fabricator's name and date of fabrication.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Styrofoam block
Marked radiographs
Wire cutting device
Light system
Physician's/oncologist's request
Radiation therapy treatment plan

ENABLING OBJECTIVES:

1. Review patient's radiation treatment plan.
2. Recall shape and thickness of needed beam block.
3. Identify and assemble tools and materials needed for fabricating styrofoam molds.
4. Review established department procedures for fabricating styrofoam molds for beam blocking.

***RESOURCES:**

1. Department policy/procedure manual.
2. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.
3. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

4. Kartha, P., & Thompson, P. (1982). Dosimetry workbook. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
5. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
6. Styrofoam blocks.
7. Marked radiographs.
8. Styrofoam cutting device.
9. Radiation treatment plan/patient's chart.
10. Checklist - Fabricating styrofoam molds for beam blocking.

TEACHING ACTIVITIES:

1. Review and show how to obtain marked radiographs and calculate treatment geometry. (* 2,4 & 9)
2. Explain and demonstrate how to place marked radiograph at prescribed source-to-film distance in device. (* 2,3 & 5)
3. Explain and demonstrate how to place styrofoam block at prescribed source-to-shadow tray distance. (* 2,3 & 5)
4. Instruct and show how to center and set wire tension, and heat on wire cutting device. (* 2 & 8)
5. Review how to trace the outline of the areas to be shielded as marked on radiograph with pointer. (* 2,6,7 & 8)
6. Explain and demonstrate how to check shape of styrofoam mold with light system. (* 1 & 7)
7. Review and show how to attach identification information to styrofoam mold. (* 1,6,7 & 9)
8. Identify and demonstrate how to record fabrication procedure on radiation treatment plan. (* 1 & 9)
9. Monitor students as they practice fabricating styrofoam molds for beams blocking. (* 6,7,8 & 9)
10. Supervise and evaluate students fabricating styrofoam molds for beam blocking. (* 10)

CRITERION-REFERENCED MEASURE:

The student must calculate treatment geometry from marked radiographs, place radiograph at source-to-film distance, position styrofoam block at source-to-shadow tray distance, set wire tension and heat on cutting device, trace outline of area to be shielded, verify shape of styrofoam mold with light system, attach identification information to styrofoam mold and record fabrication procedures on radiation treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Review radiation therapy treatment plan.
3. Obtain marked radiographs and calculate treatment geometry.
4. Place marked radiograph at prescribed source-to-film distance in device.
5. Place styrofoam block at prescribed source-to-shadow tray distance.
6. Center and set wire tension and heat on wire cutting device.
7. Trace the outline of the areas to be shielded as marked on radiograph with pointer.
   NOTE: Tracing with pointer automatically activates hot wire cutter to cut and shape the styrofoam block with tapered edge to conform with divergence of radiation beam.
8. Check shape of styrofoam mold with light system.
9. Attach identification information to styrofoam mold.
10. Record fabrication procedure on radiation treatment plan, including fabricator's name and date of fabrication.

CHECKLIST

DUTY Performing Support Services

TASK Fabricate styrofoam molds for beam blocking.

ENABLER

1. Review patient's radiation treatment plan.
2. Recall shape and thickness of needed beam block.
3. Identify and assemble tools and materials needed for fabricating styrofoam molds.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to fabricate styrofoam molds for beam blocking.

PERFORMANCE DETERMINANTS	YES	NO
1. Verified physician's/oncologist's request.	______	______
2. Reviewed radiation therapy treatment plan.	______	______
3. Obtained marked radiographs and calculated treatment geometry.	______	______
4. Placed marked radiograph at prescribed source-to-film distance in device.	______	______
5. Placed styrofoam block at prescribed source-to-shadow tray distance.	______	______
6. Centered and set wire tension and heat on wire cutting device.	______	______
7. Traced the outline of the areas to be shielded as marked on radiograph with pointer.	______	______
8. Checked shape of styrofoam mold with light system.	______	______

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
9.	Attached identification information to styrofoam mold.	______	______
10.	Recorded fabrication procedure on radiation treatment plan, including fabricator's name and date of fabrication.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 159

TASK: Fabricate customized lead shielding beam blocks with styrofoam molds.

STANDARD OF PERFORMANCE OF TASK:

Low-melting blocking material must be prepared and poured into prepared styrofoam molds to form the designated radiation beam blocks.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's/oncologist's request
Radiation treatment plan
Prepared styrofoam molds
Styrofoam mold holders
Low-melting blocking material
Trimming knife
Workbench
Lead melting ladle
Heat source

ENABLING OBJECTIVES:

1. Review physician's/oncologist's request for fabrication of lead shielding beam blocks.
2. Identify and assemble tools and materials needed for fabricating lead shielding beam blocks.
3. Review established department procedure for fabricating customized lead shielding beam blocks with styrofoam mold.

***RESOURCES:**

1. Department policy/procedure manual.
2. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnositic ultrasound. Springfield, VA: National Technical Information Service.

***RESOURCES:**

3. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
4. Styrofoam molds.
5. Styrofoam mold holders.
6. Low-melting blocking material.
7. Block fabricating tools and materials.
8. Radiation treatment plan/patient's chart.
9. Checklist - Fabricating customized lead shielding blocks with styrofoam molds.

TEACHING ACTIVITIES:

1. Review how to obtain styrofoam molds and verify identification. (* 1 & 8)
2. Demonstrate how to assemble and prepare blocking materials. (* 1,2,3 & 7)
3. Explain and show how to attach styrofoam molds to holders. (* 2,3,4 & 5)
4. Demonstrate how to pour melted blocking material into styrofoam mold and allow to cool. (* 2,4 & 6)
5. Instruct and show how to trim the edges of the molded beam block. (* 2,3 & 7)
6. Review and show how to attach identification information to molded beam block. (* 1 & 8)
7. Instruct and demonstrate how to record fabrication procedure on radiation treatment plan. (* 1,2 & 8)
8. Monitor students as they practice fabricating customized lead shielding beam blocks with styrofoam molds. (* 4,5,6,7 & 8)
9. Supervise and evaluate students fabricating customized lead shielding beam blocks with styrofoam molds. (* 9)

CRITERION-REFERENCED MEASURE:

The student must verify identification information on styrofoam mold, attach styrofoam molds to holders, melt blocking material, pour melted blocking material into mold, trim edges, attach identification information to molded beam block, and record fabrication procedure on radiation treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Obtain styrofoam molds and verify identification.

PERFORMANCE GUIDE: (cont.)

3. Assemble and prepare blocking materials.
4. Attach styrofoam molds to holders.
5. Pour melted blocking material into styrofoam mold and allow to cool.
6. Trim the edges of the molded beam block.
7. Attach identification information to molded beam block.
8. Record fabrication procedure on radiation treatment plan, including fabricator's name and date of fabrication.

CHECKLIST

DUTY Performing Support Services

TASK Fabricate customized lead shielding beam blocks with styrofoam molds.

ENABLER

1. Review physician's/oncologist's request for fabrication of lead shielding beam blocks.
2. Identify and assemble tools and materials needed for fabricating lead shielding beam blocks.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to fabricate customized lead shielding beam blocks with styrofoam molds.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Verified physician's/oncologist's request.	______	______
2. Obtained styrofoam molds and verified identification.	______	______
3. Assembled and prepared blocking materials.	______	______
4. Attached styrofoam molds to holders.	______	______
5. Poured melted blocking material into styrofoam mold and allowed to cool.	______	______
6. Trimmed the edges of the molded beam block.	______	______
7. Attached identification information to molded beam block.	______	______
8. Recorded fabrication procedure on radiation treatment plan, including fabricator's name and date of fabrication.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 160

TASK: Perform initial set-up procedure for patient receiving external beam radiation therapy.

STANDARD OF PERFORMANCE OF TASK:

The initial set-up for external beam radiation must exactly match the simulation set-up without error or variation. Verification films must be taken to confirm exact alignment of radiation portals and area to be treated. All radiation treatments administered must be recorded in number of rads received on patient's chart on a daily basis.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

X-ray film
Treatment block
Radiation treatment system
Lead shielded treatment room
Physician's request/treatment plan

ENABLING OBJECTIVES:

1. Review patient's radiation treatment plan.
2. Locate treatment blocks shells.
3. Review established department policy/procedure for performing initial set-up for external beam radiation therapy.

***RESOURCES:**

1. Department policy/procedure manual.
2. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.
3. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
4. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
6. Radiation treatment machine.
7. Lead shielded treatment room.
8. Treatment blocks and shields.
9. X-ray film.
10. Radiation treatment plan/patient's chart.
11. Checklist - Performing initial set-up procedure for external beam radiation treatment.

TEACHING ACTIVITIES:

1. Review and demonstrate how to greet patient. Verify patient I.D. and explain procedure to patient. (* 1,2,5 & 10)
2. Explain and show students how to assist patient onto treatment table. (* 2,4,5 & 6)
3. Conduct class discuss on how to position patients. (* 2,4 & 5)
4. Explain and demonstrate how to identify and insert treatment block. (* 2,3,6,7 & 8)
5. Instruct and show students how to align portal target light and treatment marks on patient. (* 2,3 & 6)
6. Instruct students on how to take verification x-rays. (* 1,2,4,6 & 9)
7. Discuss and demonstrate how to verify that patients's positioning and treatment block align exactly for desired treatment of each part. (* 2,3,6 & 10)
8. Discuss with students the need to repeat procedure until alignment is exact. (* 1,2,3 & 10)
9. Review procedure for administering radiation therapy treatment. (* 2 & 3)
10. Instruct and demonstrate how to record procedures on patient's chart. (* 1,5 & 10)
11. Monitor students as they practice performing initial set-up procedure for patient receiving external beam radiation therapy. (* 6,7,8,9 & 10)
12. Supervise and evaluate students performing initial set-up procedure for patient receiving external beam radiation therapy. (* 11)

CRITERION-REFERENCED MEASURE:

The student must verify patient,s identification, and explain procedure, identify treatment blocks and shields, position patient for treatment, position blocks and shields, verify that patient, blocks, and shield positioning are exactly as they were during simulation, reassure patient about procedure and record procedure on patient's chart and treatment plan.

PERFORMANCE GUIDE:

1. Identify and greet patient.
2. Explain procedure to patient.
3. Assist patient onto treatment table and position patient.
4. Identify and insert treatment block.
5. Align portal target light and treatment marks on patient.
6. Take x-rays of treatment area.
7. Verify that patient's positioning and treatment block align exactly for desired treatment of each port.
8. Repeat steps 5-7 until exact alignment is obtain.
9. Reassure patient about treatment procedures.
10. Administer radiation therapy treatment (see P.O. # 200).
11. Record all procedures on patient's chart.

CHECKLIST

DUTY Performing Support Services

TASK Perform initial set-up procedure for patient receiving external beam radiation therapy.

ENABLER

1. Review patient's radiation treatment plan.
2. Locate treatment blocks and shells.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform initial set-up procedure for patient receiving external beam radiation therapy.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Identified and greeted patient.	______	______
2.	Explained procedure to patient.	______	______
3.	Assisted patient onto treatment table and positioned patient.	______	______
4.	Identified and inserted treatment block.	______	______
5.	Aligned portal target light and treatment marks on patient.	______	______
6.	Made x-rays of treatment area.	______	______
7.	Verified that patient's positioning and treatment block aligned exactly for desired treatment of each port.	______	______
8.	Repeated steps 5-7 until exact alignment was obtain.	______	______
9.	Reassured patient about treatment procedures.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Administered radiation therapy treatment (see P.O. # 200).		
11. Recorded all procedures on patient's chart.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 161

TASK: Fabricate comp-filter to compensate for varying thickness of treatment area.

STANDARD OF PERFORMANCE OF TASK:

The fabricated comp-filter must allow for varying thickness in the treatment area to receive uniform radiation penetration. The total treatment area must receive uniform radiation dosage 100% of the time.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Task In Radiation Therapy And Diagnostic Ultrasound Research Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Treatment plan
Lead strips
Body caliper
Work bench
Fabrication tools

ENABLING OBJECTIVES:

1. Review radiation therapy treatment plan.
2. Recall purpose of fabricated comp-filter.
3. Review established department procedure for fabrication of comp-filter.

***RESOURCES:**

1. Department policy/procedure manual.
2. Hendee, W. (1981). Radiation therapy physics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
3. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

***RESOURCES: (cont.)**

5. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.
6. Fabrication tools and materials.
7. Radiation treatment plan/patient's chart.
8. Checklist - Fabrication comp-filter for varying thickness of treatment area.

TEACHING ACTIVITIES:

1. Demonstrate how to consult with radiation therapist and review treatment plan concerning treatment area. (* 1,5 & 7)
2. Explain and show how to sketch treatment area. (* 1,2 & 3)
3. Review and demonstrate how to greet patient and explain procedure to patient. (* 1 & 7)
4. Discuss and show how to position patient in planned treatment position. (* 1,4 & 7)
5. Instruct and demonstrate how to measure the varying thicknesses of treatment area and record on sketch. (* 2,3,5 & 6)
6. Explain and demonstrate how to secure strips of lead together until desired thickness is obtained for all of treatment area. (* 2,3,6 & 7)
7. Discuss and show how to verify treatment area measurements and comp-filter measurements. (* 2,3 & 5)
8. Review procedure and demonstrate how to verify comp-filter fabrication with radiation technologist or radiation oncologist. (* 1,2 & 7)
9. Monitor students as the practice fabrication comp-filter to compensate for varying thickness of treatment area. (* 6 & 7)
10. Supervise and evaluate students fabricating comp-filter to compensate for varying thickness of treatment area. (* 8)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain the procedure, position the patient in the planned treatment position, measure the thickness of the treatment area, sketch the treatment area, secure strips of lead together to desired thickness, and verify comp-filter with physician or oncologist.

PERFORMANCE GUIDE:

1. Consult radiation therapist and review treatment plan concerning treatment area.
2. Sketch treatment area.
3. Greet patient and explain procedure.
4. Position patient in planned treatment position.
5. Measure the varying thicknesses of treatment area and record on sketch.
   NOTE: Take all measurements twice to ensure accuracy.
6. Secure strips of lead together until desired thickness is obtained for all of treatment area.
7. Verify treatment area measurements and comp-filter measurements.
8. Verify comp-filter fabrication with radiation technologist or radiation oncologist.

CHECKLIST

DUTY Performing Support Services

TASK Fabricate comp-filter to compensate for varying thickness of treatment area.

ENABLER

1. Review radiation therapy treatment plan.
2. Recall purpose of fabricated comp-filter.

STUDENT'S NAME ______________________________ **DATE** __________

EVALUATOR'S NAME ______________________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to fabricate comp-filter to compensate for varying thickness of treatment area.

PERFORMANCE DETERMINANTS	YES	NO
1. Consulted radiation therapist and reviewed treatment plan concerning treatment area.		
2. Sketched treatment area.		
3. Greeted patient and explained procedure.		
4. Positioned patient in planned treatment position.		
5. Measured the varying thicknesses of treatment area and recorded on sketch.		
6. Secured strips of lead together until desired thickness was obtained for all of treatment area.		
7. Verified treatment area measurements and comp-filter measurements.		
8. Verified comp-filter fabrication with radiation technologist or radiation oncologist.		

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 162

TASK: Apply bolus to treatment area.

STANDARD OF PERFORMANCE OF TASK:

Bolus must prevent treatment shield surface from coming in contact with patient's skin. Procedure must be recorded on patient's chart.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks In Radiation Therapy And Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Bolus applicator
Treatment table
Physician's/oncologist's request
Radiation therapy treatment plan
Bolus material (vaseline, oil, jelly)

ENABLING OBJECTIVES:

1. Review radiation therapy treatment plan.
2. Recall purpose of bolus.
3. Review established department procedure for application of bolus.

***RESOURCES:**

1. Department policy/procedure manual.
2. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.
3. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

6. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
7. Bolus materials.
8. Bolus applicator.
9. Radiation treatment plan/patient's chart.
10. Checklist - Applying bolus to treatment area.

TEACHING ACTIVITIES:

1. Review and show students how to greet patient, verify patient identification and explain procedure to patient. (* 1,5 & 8)
2. Review and demonstrate how to assist patient onto treatment table and position patient. (* 2 & 6)
3. Explain and show student how to verify patient's outlined treatment area. (* 2,3 & 4)
4. Conduct class dicussion on determining types of bolus material. (* 2,3,4 & 6)
5. Demonstrate how to apply bolus over shielding area. (* 2,5,7 & 8)
6. Explain and demonstrate how to record procedure on patient's chart. (* 1,5 & 9)
7. Monitor students as they practice applying bolus to treatment area. (* 7,8 & 9)
8. Supervise and evaluate students applying bolus in treatment area. (* 10)

CRITERION-REFERENCED MEASURE:

The student must verify the request, verify the patient's identification and explain the procedure, position the patient, identify the type of bolus to be used, apply the bolus to the area and record the procedure on the patient`s chart.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Greet patient, verify patient's identification, and explain procedure.
3. Assist patient onto treatment table and position patient.
4. Verify patient's outlined treatment area.
5. Determine bolus material and apply bolus over shielding area in a uniform coat.
   NOTE: Bolus application should extend past edges of treatment shield.
6. Record procedure on patient's chart.

CHECKLIST

DUTY Performing Support Services

TASK Apply bolus to treatment area.

ENABLER

1. Review radiation therapy treatment plan.
2. Recall purpose of bolus.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to apply bolus to treatment area.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's/oncologist's request.	______	______
2.	Greeted patient, verified patient's identification, and explained procedure.	______	______
3.	Assisted patient onto treatment table and positioned patient.	______	______
4.	Verified patient's outlined treatment area.	______	______
5.	Determined bolus material and applied bolus over shielding area in a uniform coat.	______	______
6.	Recorded procedure on patient's chart.	______	______

DUTY: PERFORMING SUPPORT SERVICES

PERFORMANCE OBJECTIVE NO. 163

TASK: Perform computerized treatment planning.

STANDARD OF PERFORMANCE OF TASK:

Computerized treatment plan must graphically depict planned treatment area, shielding, beam portals, beam angles, treatment geometry, beam blocks, compensating filters, eye shields, supports, and restraint devices. Computerized treatment plan must be stored on magnetic storage media and hard copy.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Computer system
Computer software
Computer storage media
Radiation therapy treatment plan
Physician's/oncologist's request

ENABLING OBJECTIVES:

1. Review radiation therapy treatment plan.
2. Recall procedures for handling/storage of magnetic storage media.
3. Recall types of data entered into treatment plan.
4. Review established department procedures for performing computerized treatment planning.

***RESOURCES:**

1. Department policy/procedure manual.
2. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
3. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES:** (cont.)

4. U.S. Department fo Labor. (1977). *Fields related to radiology: Tasks in radiation therapy and diagnostioc ultrasound*. Springfield, VA: National Technical Information Service.
5. Snyder, C. (1985). *Textbook of oncology nursing*. Boston, MA: Little, Brown and Company.
6. Computer system/software.
7. Radiation treatment plan/patient's chart.
8. Checklist - Performing computerized treatment plan.

TEACHING ACTIVITIES:

1. Explain and demonstrate how to review radiation therapy treatment plan. (* 1,5 & 7)
2. Review how to turn on computer system and boot software. (* 1,2,5 & 7)
3. Conduct class discussion on patient's treatment data that needs to be entered. (* 1 & 7)
4. Demonstrate how to enter data. (* 2,3 & 6)
5. Explain and demonstrate how to compare computerized treatment plan to radiation therapy treatment plan. (* 6 & 7)
6. Review and show how to save computerized treatment plan on magnetic media and hard copy. (* 6)
7. Instruct and demonstrate how to place identification label on magnetic media and store. (* 1,4 & 5)
8. Review procedure for placing a hard copy of the computerized treatment plan in the patient's radiation treatment plan and record procedure on the patient's chart. (* 1,5 & 7)
9. Monitor students as they practice performing computerized treatment planning. (* 6 & 7)
10. Supervise and evaluate students performing computerized treatment planning. (* 8)

CRITERION-REFERENCED MEASURE:

The student must boot the software, enter the patient's treatment data, compare the computerized treatment plan to the physician's/oncologist's request, save the computerized treatment plan on magnetic media and produce a hard copy of the computerized treatment plan. The computerized treatment plan must graphically depict the planned treatment area, shielding, beam portals, beam angles, treatment geometry, beam blocks, compensation filters, eye sheilds, supports and restraint devices.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Review radiation therapy treatment plan.
3. Turn on computer system and boot software.
4. Enter patient's treatment data:
   - A. Treatment area.
   - B. Required shielding.
   - C. Beam portals and angles.
   - D. Treatment geometry.
   - E. Beam blocks or compensating filters.
   - F. Shielding accessories:
     1. Internal eye shields.
     2. Small parts shields.
     3. Restraints/supports.
5. Compare computerized treatment plan to radiation therapy treatment plan.
6. Save computerized treatment plan on magnetic media and hard copy.
7. Place identification label on magnetic media and store.
8. Place a hard copy of the computerized treatment plan in the patient's radiation treatment plan and record procedure on the patient's chart.

CHECKLIST

DUTY Performing Support Services

TASK Perform computerized treatment planning.

ENABLER

1. Review radiation therapy treatment plan.
2. Recall procedures for handling/storage of magnetic storage media.
3. Recall types of data entered into treatment plan.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform computerized treatment planning.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Verified physician's/oncologist's request.		
2. Reviewed radiation therapy treatment plan.		
3. Turned on computer system and booted software.		
4. Entered patient's treatment data:		
- Treatment area.		
- Required shielding.		
- Beam portals and angles.		
- Treatment geometry.		
- Beam blocks or compensating filters.		
- Shielding accessories.		
5. Compared computerized treatment plan to radiation therapy treatment plan.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
6. Saved computerized treatment plan on magnetic media and hard copy.		
7. Placed identification label on magnetic media and stored.		
8. Placed a hard copy of the computerized treatment plan in the patient's radiation treatment plan and recorded procedure on the patient's chart.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 164

TASK: Perform radiography using stationary x-ray units.

STANDARD OF PERFORMANCE OF TASK:

Perform diagnostic quality radiographic examinations per physician's order, utilizing a minimum of radiation exposure to patient. Radiographic images must demonstrate the correct anatomical part.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's requisition/chart
Patient identification
Stationary x-ray unit
Caliper
Technique chart
Film cassettes
Film identification apparatus
Markers (R & L)
Gonadal shield
Immobilization device(s)
Lead aprons
Radiographic processing equipment
Procedure manual

ENABLING OBJECTIVES:

1. Review physician's orders for radiographic examinations.
2. Recall requirements of shielding devices.
3. Read patient's medical history.
4. Identify anatomical parts.
5. Review established department procedure for using stationary x-ray units.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Bontrager, K., & Anthony, B. (1987). Textbook of radiographic positioning and related anatomy. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
5. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
6. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
7. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
8. Stationary x-ray unit.
9. Radiographic processing equipment.
10. Radiographic marker and shields.
11. Physician/radiologist request.
12. Technique chart.
13. Checklist - Performing radiography using stationary x-ray unit.

TEACHING ACTIVITIES:

1. Discuss/review proper procedure for verifying patient's identification and interpreting physician's orders. (* 1,5 & 11)
2. Demonstrate how to interview patient regarding medical history (if condition allows). Stress that students should question all child-bearing age women about possible pregnancies. Discuss procedure to inform necessary personnel if patient is pregnant. (* 1,2,5 & 11)
3. Explain and demonstrate how to refer to procedural manual for required positioning of part and required accessories. (* 1,2,3 & 11)
4. Show students how to transport patient to radiographic room. (* 1 & 5)
5. Discuss acceptable ways to establish rapport with patient and explain examination procedure. (* 1,5 & 11)
6. Explain and demonstrate removal of any radio-opaque objects from the area to be examined. (* 5,6 & 7)
7. Show students how to position patient accurately for area to be examined. (* 2 & 3)

TEACHING ACTIVITIES: (cont.)

8. Explain and demonstrate how to accurately measure part to be examined using appropriate measuring device. (* 2,4,6 & 7)
9. Review location of technique chart and discuss interpretation of technique chart and exposure factors. (* 1,8,11 & 12)
10. Demonstrate how to use technique chart. (* 12)
11. Identify location of control panel and explain operation of control panel. (*4 & 8)
12. Explain and demonstrate selection of KVP, MA, and time. (*4 & 8)
13. Explain to students and demonstrate how to select appropriate cassette size with respect to size of part to be examined. (* 6 & 7)
14. Review department procedure for identification of film. (* 6 & 7)
15. Show students how to mark identifying information on film. (* 6,7 & 9)
16. Demonstrate correct radiographic positioning of part being examined. (* 1,2 & 3)
17. Identify and demonstrate method for centering film for part being examined. (* 2,3 & 8)
18. Discuss and demonstrate adjusting central ray for alignment of part and film. (* 6,7 & 8)
19. Explain and demonstrate adjustment of focal film distance. (* 6 & 7)
20. Review location, operation and adjustments of horizontal and vertical shutters. (*4 & 8)
21. Demonstrate adjusting horizontal and vertical shutters for adequate collimation of part examined. (* 6,7 & 8)
22. Discuss location of lead shields, types of shields and positioning of shield over gonads if possible. (* 6,7 & 10)
23. Demonstrate positioning of lead shield. (* 10)
24. Explain methods for immobilizing part to be examined and location of accessories used for immobilization. (* 1,4 & 10)
25. Show students how to immobilize part and instruct patient not to move. (* 2,3 & 5)
26. Stress proper methods of radiation protection to personnel. (*4 & 8)
27. Explain and demonstrate method of making exposures. (* 6,7 & 8)
28. Explain and demonstrate procedure for processing radiographs. (*1 & 9)
29. Identify methods for evaluating radiographs for quality assurance. (*2 & 4)

TEACHING ACTIVITIES: (cont.)

30. Demonstrate how to evaluate readiographs for diagnostic quality noting identification of proper anatomical part, positioning, collimation, central ray and technique. (*2 & 3)
31. Instruct students to repeat exam quality if not acceptable. (* 1)
32. Assign students to practice performing radiography using stationary x-ray units. (* 8,9 & 10)
33. Supervise and evaluate students performing radiography using stationary x-ray units. (* 13)

CRITERION-REFERENCED MEASURE:

The student must position the patient, determine and set control factors, select, mark and center the film cassette, adjust the central ray, focal-film distance and collimate the beam, shield the patient as needed, make the exposure and process and evaluate the radiographs.

PERFORMANCE GUIDE:

1. Verify patient identification and physician's orders.
2. Determine radiographic projections needed to demonstrate requested anatomy:
   A. Obtain patient's medical history pertinent to examination.
   B. Check procedure manual.
3. Conduct patient into radiographic room:
   A. Greet patient and explain procedure.
   B. Instruct patient to remove any radio-opaque objects from area to be examined.
4. Position patient.
5. Measure thickness of part to be examined.
6. Check technique chart to determine exposure factors.
7. Set KVP, MA, and time on control panel.
8. Select cassette size according to size of part to be examined.
9. Identify and mark film.
10. Center the film according to the part to be examined.
11. Position part to be examined.
12. Adjust central ray to align with film and part to be examined.
13. Adjust focal-film distance.
14. Adjust horizontal and vertical shutters to collimate beam.

PERFORMANCE GUIDE: (cont.)

15. Shield the patient's gonads with lead shield if it doesn't interfere with the examination.
    NOTE: Question women of child bearing age to rule out pregnancy. If pregnant, stop exam and check with physician or radiologist to determine if exam is to be continued.
16. Immobilize part to be examined with devices or by instructions to patient.
17. Make exposure(s).
    CAUTION: Be sure anyone remaining with the patient is shielded and that persons not needed leave the room.
18. Process radiographs.
19. Evaluate radiographic images to determine if:
    A. Correct anatomical part was demonstrated.
    B. Part, film and central ray were aligned.
    C. Correct exposure factors were used.
    D. Film (right and left) was identified.
    E. Film demonstrated evidence of collimation.
       NOTE: If above conditions are not acceptable, repeat steps 4-19.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Perform radiography using stationary x-ray units.

ENABLER

1. Review physician's orders for radiographic examinations.
2. Recall requirements of shielding devices.
3. Read patient's medical history.
4. Identify anatomical parts.

STUDENT'S NAME________________ **DATE**________

EVALUATOR'S NAME________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform radiography using stationary x-ray units.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Verified patient's identification and physician's orders.	______	______
2. Determined radiographic projections needed to demonstrate requested anatomy:		
- Obtained patient's medical history pertinent to examination.	______	______
- Checked procedure manual.	______	______
3. Conducted patient into radiographic room:		
- Greeted patient and explained procedure.	______	______
- Instructed patient to remove any radio-opaque objects from area to be examined.	______	______
4. Positioned patient.	______	______
5. Measured thickness of part to be examined.	______	______

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
6.	Checked technique chart to determine exposure factors.		
7.	Set KVP, MA, and time on control panel.		
8.	Selected cassette size according to size of part to be examined.		
9.	Identified and marked film.		
10.	Centered the film according to the part to be examined.		
11.	Positioned part to be examined.		
12.	Adjusted central ray to align with film and part to be examined.		
13.	Adjusted focal-film distance.		
14.	Adjusted horizontal and vertical shutters to collimate beam.		
15.	Shielded the patient's gonads with lead shield if it didn't interfere with the examination.		
16.	Immobilized part to be examined with devices or by instructions to patient.		
17.	Made exposure(s).		
18.	Processed radiographs.		
19.	Evaluated radiographic images to determine if:		
	- Correct anatomical part was demonstrated.		
	- Part, film and central ray were aligned.		
	- Correct exposure factors were used.		
	- Film (right and left) was identified.		
	- Film demonstrated evidence of collimation.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 165

TASK: Perform radiography using portable x-ray units.

STANDARD OF PERFORMANCE OF TASK:

Perform diagnostic quality examinations per physician's order utilizing a minimum of radiation exposure to patient. Radiographic images must demonstrate the correct anatomical part.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Mobile radiographic unit
Physician's requistion/chart
Patient identification
Procedure manual
Calipers
Technique chart
Film cassettes
Film identifications apparatus
Markers (right and left)
Immobilization device(s)
Lead aprons
Radiographic processing equipment

ENABLING OBJECTIVES:

1. Review physician's orders for radiographic examinations.
2. Recall requirements of shielding devices.
3. Read patient's medical history.
4. Identify anatomical parts.
5. Review established department procedure for using portable x-ray units.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

3. Bontrager, K., & Anthony, B. (1987). Textbook of radiographic positioning and related anatomy. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
5. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
6. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
7. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
8. Portable x-ray unit.
9. Radiographic processing unit.
10. Radiographic markers and shields.
11. Physician/radiologist request.
12. Technique chart.
13. Checklist - Performing radiography using portable x-ray unit.

TEACHING ACTIVITIES:

1. Review and demonstrate proper procedure for transporting mobile x-ray unit. (* 6 & 7)
2. Explain and show how to determine radiographic projections needed to demonstrate requested anatomy. (* 1)
3. Instruct students to position mobile unit so as not to obstruct other medical equipment and activities. (* 1 & 8)
4. Explain and show how to measure thickness of part to be examined. (* 2 & 3)
5. Review how to check technique chart to determine exposure factors. (* 11 & 12)
6. Demonstrate how to set kvp, MA and time on control panel. (* 6,7 & 8)
7. Instruct and show students how to select cassette size, and identify and mark film. (* 1 & 11)
8. Demonstrate how to center the film and position part to be examined. (* 2,3 & 4)
9. Explain and show students how to adjust central ray, focal-film distance, and horizontal and vertical shutters. (* 6,7 & 8)
10. Stress that patient's gonads should be shielded with lead shield, if possible. (* 1,5 & 10)

TEACHING ACTIVITIES: (cont.)

11. Discuss and show how to immobilize part to be examined with devices or by instructions to patient. (* 5 & 10)
12. Instruct students to make exposures and remove cassettes. (* 2,6,7 & 8)
13. Demonstrate how to remove portable from room. (* 1 & 8)
14. Review and demonstrate how to process and evaluate radiographs. (* 9)
15. Explain and show students how to return mobile unit to its proper location and recharge mobile unit, if necessary. (* 4 & 8)
16. Monitor students as they practice performing radiography using portal x-ray units. (* 8,9,10,11 & 12)
17. Supervise and evaluate students performing radiography using portal x-ray units. (* 13)

CRITERION-REFERENCED MEASURE:

The student must verify the patient's identification and explain the procedure, position the patient, determine and set control factors, select, mark and center the film cassette, adjust the central ray, focal-film distance and collimate the beam, shield the patient as needed, make the exposure and process and evaluate the radiographs. The radiation exposure must be minimal and the radiographic images must demonstrate the correct anatomical part.

PERFORMANCE GUIDE:

1. Transport mobile x-ray unit to patient's location.
2. Verify patient identification.
3. Determine radiographic projections needed to demonstrate requested anatomy:
   A. Obtain patient's medical history pertinent to examination.
   B. Check procedure manual.
      NOTE: Specific instructions relating to patient's condition may be obtained at nurse's station.
4. Position mobile unit so as not to obstruct other medical equipment and activities.
5. Measure thickness of part to be examined.
6. Check technique chart to determine exposure factors.
7. Set kvp, MA, and time on control panel.

PERFORMANCE GUIDE: (cont.)

8. Select cassette size according to size of part to be examined.
9. Identify and mark film.
10. Center the film according to the part to be examined.
11. Position part to be examined.
12. Adjust central ray to align with film and part to be examined.
13. Adjust focal-film distance.
14. Adjust horizontal and vertical shutters to collimate beam.
15. Shield the patient's gonads with lead shield if it doesn't interfere with the examination.
16. Immobilize part to be examined with devices or by instructions to patient.
17. Make exposure(s).
    CAUTION: Be sure anyone assisting with the patient is shielded and that persons not needed leave the room.
18. Remove cassette.
19. Remove portable from room.
20. Process radiographs.
21. Evaluate radiographs to determine if:
    - A. Correct anatomical part was demonstrated.
    - B. Body part, film, and central ray were aligned.
    - C. Correct exposure factors were used.
    - D. Film (right and left of patient) were identified.
    - E. Film demonstrates evidence of collimation.
      NOTE: If above conditions are not acceptable, repeat steps 5-22.
22. Return mobile unit to its proper location. Recharge mobile unit if applicable.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Perform radiography using portable x-ray units.

ENABLER

1. Review physician's orders for radiographic examinations.
2. Recall requirements of shielding devices.
3. Read patient's medical history.
4. Identify anatomical parts.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform radiography using portable x-ray units.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Transported mobile x-ray unit to patient's location.		
2.	Verified patient identification.		
3.	Determined radiographic projections needed to demonstrate requested anatomy.		
4.	Positioned mobile unit so as not to obstruct other medical equipment and activities.		
5.	Measured thickness of part to be examined.		
6.	Checked technique chart to determine exposure factors.		
7.	Set kvp, MA, and time on control panel.		
8.	Selected cassette size according to size of part to be examined.		
9.	Identified and marked film.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
10.	Centered the film according to the part to be examined.		
11.	Positioned part to be examined.		
12.	Adjusted central ray to align with film and part to be examined.		
13.	Adjusted focal-film distance.		
14.	Adjusted horizontal and vertical shutters to collimate beam.		
15.	Shielded the patient's gonads with lead shield if it didn't interfere with the examination.		
16.	Immobilized part to be examined with devices or by instructions to patient.		
17.	Made exposure(s).		
18.	Removed cassette.		
19.	Removed portable from room.		
20.	Processed radiographs.		
21.	Evaluated radiographs to determine if:		
	- Correct anatomical part was demonstrated.		
	- Body part, film, and central ray were aligned.		
	- Correct exposure factors were used.		
	- Film (right and left of patient) was identified.		
	- Film demonstrated evidence of collimation.		
22.	Returned mobile unit to its proper location. Recharged mobile unit, if applicable.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURE

PERFORMANCE OBJECTIVE NO. 166

TASK: Conduct computerized tomography scans.

STANDARD OF PERFORMANCE OF TASK:

The scan must be performed in a manner that will yield images of the anatomical region requested and must yield diagnostic information for the treatment of the patient with as little discomfort as possible to the patient.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

CT scanner
CT chart
Contrast media
Recording media
Consent form
Request form
Procedure manual

ENABLING OBJECTIVES:

1. Read patient's medical history.
2. Identify anatomical parts.
3. Review established department procedures for conducting computerized tomography scans.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Goldberg, H., Higgins, C., & Ring, E. (1985). Contemporary imaging: Magnetic resonance imaging, computed tomograpy, and interventional radiology. St. Louis, MO: C.V. Mosby Company.
4. Haaga, J., & Alfidi R. (1983). Computed tomography of the whole body. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

5. Haaga, J., & Alfidi, R. (1984). Computed tomography of the abdomen. St. Louis, MO: C.V. Mosby Company.
6. Hendee, W. (1983). The physical priciples of computed tomography. Boston, MA: Little, Brown and Company.
7. Latchaw, R. (1985). Computed tomography of the head, neck, and spine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
8. Megibow, A., & Balthazar, J. (1986). Computed tomography of the gastrointestinal tract. St. Louis, MO: Mosby Company.
9. Computerized tomography scanner.
10. Computerized tomography chart.
11. Consent form.
12. Contrast media.
13. Radiographic procedure manual.
14. Checklist - Conducting computerized tomography.

TEACHING ACTIVITIES:

1. Discuss and show how to establish the protocol to be used. (* 1 & 13)
2. Explain and demonstrate how to establish and program the necessary parameters required to conduct the scan of the organs in question. (* 3,4,5,6,7,8 & 10)
3. Demonstrate how to establish the desired recording media, log the location for retrieval, and prepare the dose if contrast study has been requested. (* 1,2,12 & 13)
4. Review and demonstrate how to verify patient identification, assist patient onto scanner table and position the patient. (* 2 & 11)
5. Discuss how to ensure all safety devices are in place. (* 1,2 & 13)
6. Review and show the students how to explain the procedure to the patient and obtain consent. (* 1 & 11)
7. Explain and demonstrate how to conduct the scan. (*2,3,4,5,6 & 7)
8. Discuss and show students how to review raw data for completeness and quality. (* 9,10 & 13)
9. Instruct students to verify data, remove patient from the table and release. (* 1 & 13)
10. Monitor students as they practice performing computerized tomography scans. (* 9,10,11,12 & 13)
11. Supervise and evaluate students conducting computerized tomography scans. (* 14)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain the procedure, position the patient, ensure all safety devices are in place, conduct the scan, and verify the data. The scan must yield images of the anatomical region requested and must yield diagnostic information for the treatment of the patient.

PERFORMANCE GUIDE:

1. Establish the protocal to be used prior to the patient's arrival.
2. Establish and program the necessary parameters required to conduct the scan of the organs in question.
3. Establish the desired recording media, log the location for retrieval, and prepare the dose, if a contrast study has been requested.
4. Verify patient identification, and position the patient on the scanner table in accordance with the department protocol.
5. Ensure all safety devices are in place.
6. Explain the procedure to the patient and obtain the consent to continue.
7. Conduct the scan, insuring enough sections are obtained to analyze the organ system requested.
8. Review all of the raw data for completeness and quality prior to dismissing the patient.
9. Verify data, remove patient from the table, and release.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedure

TASK Conduct computerized tomography scans.

ENABLER

1. Read patient's medical history.
2. Identify anatomical parts.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct computerized tomography scans.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Established the protocal to be used prior to the patient's arrival.		
2.	Established and programmed the necessary parameters required to conduct the scan of the organs in question.		
3.	Established the desired recording media, logged the location for retrieval, and prepared the dose, if a contrast study had been requested.		
4.	Verified patient identification, and positioned the patient on the scanner table in accordance with the department protocol.		
5.	Ensured all safety devices were in place.		
6.	Explained the procedure to the patient and obtained the consent to continue.		
7.	Conducted the scan, insuring enough sections were obtained to analyze the organ system requested.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
8. Reviewed all of the raw data for completeness and quality prior to dismissing the patient.	________	________
9. Verified data, removed patient from the table, and released.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 167

TASK: Perform tomography.

STANDARD OF PERFORMANCE OF TASK:

Perform diagnostic quality tomographic radiographs, utilizing a minimum of radiation exposure to the patient. Requested anatomy must be demonstrated by the tomographic section (cut).

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's orders
Patient identification
Tomographic x-ray unit
Caliper
Technique chart
Film cassette
Film markers
Gonadal Shield
Immobilization devices
Lead aprons
Procedure manual

ENABLING OBJECTIVES:

1. Review physician's orders for tomographic radiographs.
2. Recall requirements of shielding devices.
3. Read patient's medical history.
4. Identify anatomical parts.
5. Review established department procedures for performing tomographic radiographs.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
5. Centrifuge.
6. Tomographic unit.
7. Blood samples in test tubes.
8. Serum separation and storage equipment.
9. Radiographic measuring and marking equipment.
10. Radiation protection devices.
11. Physician's/radiologist's request.
12. Technique chart.
13. Checklist - Performing tomography.

TEACHING ACTIVITIES:

1. Explain and demonstrate how to attach or set up tomographic equipment. (* 6,7 & 8)
2. Review how to verify patient identification. (* 1 & 5)
3. Explain and show how to determine radiographic projections needed to demonstrate requested anatomy. (* 2 & 3)
4. Explain and demonstrate how to determine the type of motion to be used, fulcrum levels and number of cuts needed. (* 6,7 & 8)
5. Review and show how to greet patient, explain procedure and determine if female patient is pregnant. (* 1,2,3 & 5)
6. Demonstrate how to assist patient onto table. (* 2,3 & 5)
7. Explain and demonstrate how to measure thickness of part to be examined. (* 2,6,7 & 9)
8. Instruct and show students how to check technique chart to determine exposure factors. (* 1 & 12)
9. Demonstrate how to set kvp, MA and time on control panel. (* 4,6,7 & 8)
10. Explain and show how to select film size and identify and mark film. (* 1,4 & 7)
11. Show students how to center the film according to examination area. (* 6 & 7)
12. Discuss how to position part to be examined. (* 2 & 3)
13. Explain and demonstrate how to adjust central ray, focal-film distance and fulcrum levels, and horizontal and vertical shutters. (* 6,7 & 8)
14. Instruct students to shield patient's gonads with lead shield if possible. (* 1,5 & 10)

TEACHING ACTIVITIES: (cont.)

15. Demonstrate how to immobilize part to be examined with devices or by instructions to patient. (* 1 & 5)
16. Review how to make exposures. (* 6,7 & 9)
17. Explain and show how to readjust fulcrum for next tomographic section. (* 6,7 & 8)
18. Instruct students on how to replace exposed film with unexposed film. (* 4,7 & 8)
19. Discuss and demonstrate how to process and evaluate tomograms for technical adequacy. (* 1,2 & 11)
20. Instruct students on how to show tomograms to radiologist before patient leaves. (* 1)
21. Monitor students as they practice performing tomography. (* 8,9,10 & 11)
22. Supervise and evaluate students performing tomography. (* 13)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain the procedure, position the patient, ensure all safety devices are in place, conduct the scan, and verify the data. The scan must yield images of the anatomical region requested and must yield diagnostic information for the treatment of the patient.

PERFORMANCE GUIDE:

1. Attach or set up tomographic equipment.
2. Verify patient identification and physician's orders.
3. Determine radiographic projections needed to demonstrate requested anatomy:
    A. Obtain patient's medical history pertinent to examination.
    B. Check procedure manual.
    C. Examine previous radiographs.
4. Determine type of motion to be used, fulcrum levels and number of cuts needed to demonstrate the pathology or anatomy.
5. Conduct patient into radiographic room:
    A. Greet patient.
    B. Determine patient is not pregnant.
    C. Explain procedure.
6. Assist patient on table.
7. Measure thickness of part to be examined.
8. Check technique chart to determine exposure factors.
9. Set kvp, MA, and time on control panel.

PERFORMANCE GUIDE: (cont.)

10. Select film size according to size of part to be examined.
11. Identify and mark film.
12. Center the film according to the part to be examined.
13. Position part to be examined.
14. Adjust central ray to align with film and part to be examined.
15. Adjust focal-film distance and fulcrum levels.
16. Adjust horizontal and vertical shutters to collimate beam.
17. Shield the patient's gonads with lead shield, if it doesn't interfere with the examination.
18. Immobilize part to be examined with devices or by instructions to patient.
19. Make exposure(s).

    CAUTION: Be sure anyone assisting with the patient is shielded and that persons not needed leave the room.

    NOTE: Develop and show first cut to radiologist to ensure proper positioning and technique and to minimize exposure.
20. Readjust fulcrum for next tomographic section (cut).
21. Replace exposed film with unexposed film.
22. Make exposure(s).
23. Process tomograms.
24. Evaluate tomograms for technical adequacy:
    A. Correct anatomical part was demonstrated.
    B. Aligned body part, film, and central ray properly.
    C. Used correct exposure factors.
    D. Identified film (right and left of patient).
    E. Depth of body section radiographed.

       NOTE: If above conditions are not acceptable, repeat steps 7-19.
25. Show tomograms to radiologist before patient leaves in case of other instructions.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Perform tomography.

ENABLER

1. Review physician's orders for tomographic radiographs.
2. Recall requirements of shielding devices.
3. Read patient's medical history.
4. Identify anatomical parts.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform tomography.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Attached or set up tomographic equipment.	______	______
2.	Verified patient identification and physician's orders.	______	______
3.	Determined radiographic projections needed to demonstrate requested anatomy.	______	______
4.	Obtained patient's medical history pertinent to examination.	______	______
5.	Checked procedure manual.	______	______
6.	Examined previous radiographs.	______	______
7.	Determined type of motion to be used, fulcrum levels and number of cuts needed to demonstrate the pathology or anatomy.	______	______
8.	Conducted patient into radiographic room.	______	______
9.	Greeted patient.	______	______

PERFORMANCE DETERMINANTS (cont.)

10. Determined patient was not pregnant. ________ ________
11. Explained procedure. ________ ________
12. Assisted patient on table. ________ ________
13. Measured thickness of part to be examined. ________ ________
14. Checked technique chart to determine exposure factors. ________ ________
15. Set kvp, MA, and time on control panel. ________ ________
16. Selected film size according to size of part to be examined. ________ ________
17. Identified and marked film. ________ ________
18. Centered the film according to the part to be examined. ________ ________
19. Positioned part to be examined. ________ ________
20. Adjusted central ray to align with film and part to be examined. ________ ________
21. Adjusted focal-film distance and fulcrum levels. ________ ________
22. Adjusted horizontal and vertical shutters to collimate beam. ________ ________
23. Shielded the patient's gonads with lead shield, if it didn't interfere with the examination. ________ ________
24. Immobilized part to be examined with devices or by instructions to patient. ________ ________
25. Made exposure(s). ________ ________
26. Readjusted fulcrum for next tomographic section (cut). ________ ________
27. Replaced exposed film with unexposed film. ________ ________
28. Made exposure(s). ________ ________

PERFORMANCE DETERMINANTS (cont.)	YES	NO
29. Processed tomograms.		
30. Evaluated tomograms for technical adequacy.		
31. Checked that correct anatomical part was demonstrated.		
32. Aligned body part, film, and central ray properly.		
33. Used correct exposure factors.		
34. Identified film (right and left of patient).		
35. Radiographed depth of body section.		
36. Showed tomograms to radiologist before patient left in case of other instructions.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 168

TASK: Conduct operating room radiography.

STANDARD OF PERFORMANCE OF TASK:

Perform diagnostic quality radiographs in the operating suite, utilizing a mobile radiographic unit. Radiation exposure to the patient must be minimal. Mobile unit must be disinfected.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Mobile radiographic unit
Physician's requisition/chart
Patient identification
Procedure manual
Calipers
Technique chart
Film cassettes
Film identification apparatus
Markers (right and left)
Immobilization device(s)
Lead aprons
Radiographic processing equipment
Disinfectant
Surgical scrubs
Sterile cassette covering

ENABLING OBJECTIVES:

1. Recall disinfection requirements for mobile x-ray unit.
2. Recall surgical clothing required.
3. Recall requirements for shielding devices.
4. Identify anatomical parts.
5. Review established procedure for conducting operating room radiography.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Bontrager, K., & Anthony, B. (1987). Textbook of radiographic positioning and related anatomy. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
5. Ehrlich, R. A., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.
6. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
7. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
8. Portable x-ray unit.
9. Radiographic processing unit.
10. Radiographic markers and shields.
11. Physician/radiologist request.
12. Technique chart.
13. Checklist - Performing radiography in operating room.

TEACHING ACTIVITIES:

1. Show students how to transport mobile x-ray unit to operating suite. (* 1 & 8)
2. Explain and demonstrate how to disinfect equipment. (* 1 & 5)
3. Instruct students on procedure for reporting to the operating room supervisor. (* 1)
4. Explain department procedure and show students how to don surgical clothing. (* 1,2 & 5)
5. Demonstrate how to set up mobile equipment using sterile technique. (* 4,6 & 7)
6. Explain and demonstrate how to determine projections. (* 1,2 & 3)
7. Discuss and show students how to measure thickness of part to be examined. (* 2,3 & 10)
8. Explain and demonstrate how to check technique chart to determine exposure factors. (* 2,3,4 & 12)
9. Explain and demonstrate how to set kvp, MA and time on control panel. (* 6,7 & 8)
10. Review how to select film size according to size of part to be examined. (* 4)

TEACHING ACTIVITIES: (cont.)

11. Instruct and demonstrate how to identify and mark film. (* 1,2,5 & 11)
12. Explain the placement of cassette in sterile covering to be positioned by physician. (* 1)
13. Discuss and demonstrate how to adjust central ray, focal-film distance, and horizontal and vertical shutters. (* 2,3,6 & 7)
14. Discuss and demonstrate how to shield patient's gonads with lead shield if possible. (* 5 & 10)
15. Discuss and show students how to immobilize part to be examined with devices, anesthetist or instructions to patient. (* 2,3 & 5)
16. Review how to make exposure and process radiographs. (* 1,2,6 & 9)
17. Instruct students to remove equipment when surgeon indicates radiographs are satisfactory. (* 1)
18. Demonstrate how to return mobile unit and recharge mobile unit if indicated. (* 8)
19. Monitor students as they practice conducting operating room radiography. (* 8,9,10,11 & 12)
20. Supervise and evaluate students conducting operating room radiography. (* 13)

CRITERION-REFERENCED MEASURE:

The student must disinfect the equipment, don surgical clothing, determine and set the control factors, select, mark and center the film cassette, take x-rays, process radiographs, and return and recharge mobile unit.

PERFORMANCE GUIDE:

1. Take mobile x-ray unit to operating suite.
2. Disinfect equipment.
3. Report to the operating room supervisor.
4. Don surgical clothing according to current department policy.
5. Set up mobile equipment in operating room, so as not to obstruct other medical equipment and activities.
   CAUTION: Observe sterile technique.
6. Verify patient identification.
7. Determine projections, according to surgeon's request.
8. Measure thickness of part to be examined.
9. Check technique chart to determine exposure factors.
10. Set kvp, MA, and time on control panel.
11. Select film size according to size of part to be examined.
12. Identify and mark film.

PERFORMANCE GUIDE: (cont.)

13. Place cassette in sterile covering to be positioned by physician.
14. Adjust central ray to align with film and part to be examined.
15. Adjust focal-film distance.
16. Adjust horizontal and vertical shutters to collimate beam.
17. Shield the patient's gonads with lead shield, if it doesn't interfere with the examination.
18. Immobilize part to be examined with devices or by instructions to patient or anesthetist.
19. Make exposure(s).
    CAUTION: Be sure anyone remaining with the patient is shielded and that persons not needed leave the room.
20. Process radiographs and return them to surgeon.
21. Make additional radiographs, if requested by surgeon.
22. Remove equipment when surgeon indicates radiographs are satisfactory.
23. Return mobile unit to proper location.
24. Recharge mobile unit if indicated.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct operating room radiography.

ENABLER

1. Recall disinfection requirements for mobile x-ray unit.
2. Recall surgical clothing required.
3. Recall requirements for shielding devices.
4. Identify anatomical parts.

STUDENT'S NAME ______________________ **DATE** __________

EVALUATOR'S NAME ______________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct operating room radiography.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Took mobile x-ray unit to operating suite.		
2.	Disinfected equipment.		
3.	Reported to the operating room supervisor.		
4.	Donned surgical clothing according to current department policy.		
5.	Set up mobile equipment in operating room, so as not to obstruct other medical equipment and activities.		
6.	Verified patient identification.		
7.	Determined projections, according to surgeon's request.		
8.	Measured thickness of part to be examined.		
9.	Checked technique chart to determine exposure factors.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Set kvp, MA, and time on control panel.		
11. Selected film size according to size of part to be examined.		
12. Identified and marked film.		
13. Placed cassette in sterile covering to be positioned by physician.		
14. Adjusted central ray to align with film and part to be examined.		
15. Adjusted focal-film distance.		
16. Adjusted horizontal and vertical shutters to collimate beam.		
17. Shielded the patient's gonads with lead shield, if it didn't interfere with the examination.		
18. Immobilized part to be examined with devices or by instructions to patient or anesthetist.		
19. Made exposure(s).		
20. Processed radiographs and returned them to surgeon.		
21. Made additional radiographs, if requested by surgeon.		
22. Removed equipment when surgeon indicated radiographs were satisfactory.		
23. Returned mobile unit to proper location.		
24. Recharged mobile unit if indicated.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 169

TASK: Conduct xeroradiography.

STANDARD OF PERFORMANCE OF TASK:

Diagnostic quality image must be obtained utilizing the xeroradiographic processing system. Xeroradiographic image must demonstrate the requested anatomical image without fogging or artifacts.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Markers
Calipers
Physician's orders
Radiographic exposure room
Xerox processor and conditioner
Xeroradiographic technique chart
Xeroradiographic cassettes/plates

ENABLING OBJECTIVES:

1. Review physician's orders for xeroradiographic imaging.
2. Identify anatomical parts.
3. Review established department procedures for using xeroradiographic equipment.

***RESOURCES:**

1. Department policy/procedure manual.
2. Armstrong, P., & Wastie, M. (1986). Diagnostic imaging. Boston, MA: Blackwell Scientific Publications Ltd.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Bontrager, K., & Anthony, B. (1987). Textbook of radiographic positioning and related anatomy. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

5. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
6. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
7. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
8. Xerox processor and conditioner.
9. Xeroradiographic technique chart.
10. Xeroradiographic cassette/plates.
11. Physician/radiologist's request.
12. Radiographic tools and equipment.
13. Checklist - Conducting xeroradiography.

TEACHING ACTIVITIES:

1. Review and show students how to greet patient, escort radiographic room, explain procedure, and ascertain that female patient is not pregnant. (* 1 & 3)
2. Explain and demonstrate how to load a cassette with a charged plate in the xeroradiographic container. (* 4,5,6,7 & 10)
3. Instruct and show how to center the x-ray tube to the cassette and position the part to be x-rayed over the cassette. (* 1,3,5 & 6)
4. Review how to identify R & L on film with markers. (* 1)
5. Explain and demonstrate how to measure the part to be x-rayed with calipers and select techniques accordingly. (* 1 & 12)
6. Discuss and demonstrate how to expose film and develop in xeroradiographic processor. (* 1,2,3 & 8)
7. Explain and show students how to review image to ascertain diagnostic quality (* 12)
8. Instruct students to make necessary changes and repeat procedure if needed to provide diagnostic quality images (* 1)
9. Demonstrate how to escort patient out of radiographic room. (* 1 & 5)
10. Monitor students as they practice conducting xeroradiography. (* 8,9,10,11 & 12)
11. Supervise and evaluate students conducting xeroradiography. (* 13)

CRITERION-REFERENCED MEASURE:

Student must load a cassette plate, center the x-ray tube, mark the film, select the technique' expose the film, developed and review the film. The xeroradiographic image must demonstrate requested anatomical image without fogging or artifacts.

PERFORMANCE GUIDE:

1. Review physician's orders for exam/views requested.
2. Greet patient, escort to radiographic room, explain procedure, and ascertain that patient is not pregnant.
3. Load a cassette with a charged plate in the xeroradiographic conditioner.
4. Center the x-ray tube to the cassette and position the part to be x-rayed over the cassette.
5. Identify R and L on film with markers.
6. Measure the part to be x-rayed with calipers and select techniques accordingly.
7. Expose film.
8. Develop film in xeroradiographic processor.
9. Review image to ascertain diagnostic quality, repeating steps 2-7 making necessary changes to provide a diagnostic quality image.
10. Escort patient out of radiographic room when exam is finished.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct xeroradiography.

ENABLER

1. Review physician's orders for xeroradiographic imaging.
2. Identify anatomical parts.

STUDENT'S NAME________________________ **DATE**__________

EVALUATOR'S NAME________________________ **COURSE**_________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct xeroradiography.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Reviewed physician's orders for exam/views requested.		
2.	Greeted patient, escorted to radiographic room, explained procedure, and ascertained that patient was not pregnant.		
3.	Loaded a cassette with a charged plate in the xeroradiographic conditioner.		
4.	Centered the x-ray tube to the cassette and positioned the part to be x-rayed over the cassette.		
5.	Identified R and L on film with markers.		
6.	Measured the part to be x-rayed with calipers and selected techniques accordingly.		
7.	Exposed film.		
8.	Developed film in xeroradiographic processor.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Reviewed image to ascertain diagnostic quality, repeated steps 2-7 making necessary changes to provide a diagnostic quality image.		
10. Escorted patient out of radiographic room when exam was finished.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 170

TASK: Perform mammography.

STANDARD OF PERFORMANCE OF TASK:

Perform radiographic examination of the breasts. Filming must be accurate and provide low radiation exposure to the tissues. Films must display maximum detail and contrast, while demonstrating structures as small as 0.1mm with minimal discomfort to the patient.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's orders
Markers
Radiographic unit
Calipers
Compression device
Low dose film-screen combination
Radiographic processing equipment
Phantom

ENABLING OBJECTIVES:

1. Review physician's request.
2. Identify and prepare equipment/instruments needed for mammography examination.
3. Greet patient and explain procedure.
4. Review established department policy/procedure for performing mammography examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Kreel, L. (1980). Clark's positioning in radiography (Vols. 1 & 2). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES:** (cont.)

4. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
5. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
6. Radiographic imaging unit.
7. Radiographic film processing equipment.
8. Compression device.
9. Marking/measuring devices.
10. Checklist - Performing mammography examination.

TEACHING ACTIVITIES:

1. Discuss procedure for preparing patient for the mammography examination. (* 1 & 2)
2. Discuss and demonstrate how to position breast on cassette and mark as right or left breast and view. (* 3,4 & 5)
3. Show students how to measure breasts with caliper and apply compression device to breast. (* 9)
4. Review procedure for aligning radiographic tube to film. (* 2 & 3)
5. Discuss how to use technique chart to determine best method for performing mammography. (* 1)
6. Demonstrate procedure for using technique chart to select procedure according to thickness and density of breast.
7. Review procedure for instructing patient to suspend respiration. (* 1)
8. Discuss and demonstrate procedure for taking mammography views. (* 2,3 & 4)
9. Review technique for exposing radiographic films. (* 2,3 & 6)
10. Demonstrate how to release breast compression device. (* 8)
11. Review procedure for developing films and verifying images. (* 1,2 & 5)
12. Supervise students practicing mammography examination. (* 6,7,8 & 9)
13. Evaluate students performance while performing mammography examination. (* 10)

CRITERION-REFERENCED MEASURE:

The student must greet the patient and explain procedure, prepare patient for examination, position breast on film, mark the film, measure patient's breast, apply compression device, align film, select technique, expose film, develop film and verify the images.

PERFORMANCE GUIDE:

1. Greet patient and provide patient with instructions:
    - A. Instruct patient to remove clothing and jewelry above waist and don gown.
    - B. Check physician's orders to ascertain exam requested and history pertinent to exam.
    - C. Explain procedure to patient and ascertain that patient is not pregnant.
    - D. Escort patient into radiographic room.
2. Position patient's breast on cassette, utilizing markers to indicate view, right or left breast, and medial lateral relation.
3. Measure patient's breast with calipers.
4. Apply compression to breast with compression device.
5. Align tube to film.
6. Refer to technique chart and select technique according to centimeter thickness and density of breast.
7. Instruct patient to suspend respiration.
8. Expose film.
9. Release compression from breast and develop film.
10. Review image for diagnostic quality, repeating steps 2-9, making necessary changes to obtain a diagnostic quality image.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Perform mammography.

ENABLER

1. Review physician's request.
2. Identify and prepare equipment/instruments needed for mammography examination.
3. Greet patient and explain procedure.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform mammography.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Greeted patient and provided patient with instructions:		
- Instructed patient to remove clothing and jewelry above waist and don gown.	______	______
- Checked physician's orders to ascertain exam requested and history pertinent to exam.	______	______
- Explained procedure to patient and ascertained that patient is not pregnant.	______	______
- Escorted patient into radiographic room.	______	______
2. Positioned patient's breast on cassette, utilizing markers to indicate view, right or left breast, and medial lateral relation.	______	______
3. Measured patient's breast with calipers.	______	______
4. Applied compression to breast with compression device.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
5. Aligned tube to film.		
6. Referred to technique chart and selected technique according to centimeter thickness and density of breast.		
7. Instructed patient to suspend respiration.		
8. Exposed film.		
9. Released compression from breast and developed film.		
10. Reviewed image for diagnostic quality, repeating steps 2-9, making necessary changes to obtain a diagnostic quality image.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 171

TASK: Conduct/assist with contrast radiographs.

STANDARD OF PERFORMANCE OF TASK:

Assist radiologist with fluoroscopic examination utilizing contrast media(s). Radiologic technologist must proceed only as instructed by radiologist. All instructions must be followed without error.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's requisition/chart
Patient's identification
Caliper
Technique chart
Film cassettes
Film identification apparatus
Markers (right and left)
Gonadal shield
Immobilization device(s)
Lead aprons
Radiographic processing equipment
Procedure manual
R/F unit
Contrast media

ENABLING OBJECTIVES:

1. Review physician's orders for fluoroscopic examination.
2. Recall requirement of shielding devices.
3. Identify anatomical parts.
4. Review established department procedures for performing fluoroscopic examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
4. Ring, E., & McLean, G. (1987). Interventional radiology: Principles and techniques. Boston, MA: Little, Brown and Company.
5. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
6. Wilkins, R., & Viamonte, M. (1982). Interventional radiology. Boston, MA: Blackwell Scientific Publications Ltd.
7. Technique chart.
8. Contrast media.
9. Fluoroscopic examination unit.
10. Radiographic processing equipment.
11. Patient's chart/medical history.
12. Checklist - Assisting with contrast radiographs.

TEACHING ACTIVITIES:

1. Review and show students how to greet patient, explain procedure and verify that female patients are not pregnant. (* 1 & 11)
2. Review how to assist patient onto x-ray table. (* 1 & 2)
3. Explain and demonstrate how to make preliminary radiographs of area to be examined and process radiographs. (* 3,5 & 10)
4. Instruct and show how to set up fluoroscopic equipment. (* 3,4,6,7 & 9)
5. Discuss and demonstrate how to adjust x-ray table to correct position. (* 1 & 2)
6. Review and show how to load film in camera, and mark and identify film. (* 2,3,5 & 9)
7. Explain and demonstrate how to set KVP, MA and time on control panel. (* 2,5 & 9)
8. Identify contrast media and supplies needed and assemble. (* 1,7 & 8)
9. Discuss and demonstrate how to position patient on x-ray table. (* 2,3 & 5)
10. Explain and show how to administer the contrast media or how to assist radiologist with administration of contrast. (* 4,6 & 8)
11. Discuss and demonstrate how to assist radiologist with fluoroscopy and spot filming. (* 3,4,6 & 9)

TEACHING ACTIVITIES: (cont.)

12. Review how to assist patient off x-ray table and provide patient with appropriate post-examination instructions. (* 1 & 11)
13. Explain and demonstrate how to process and evaluate radiographic images. (* 1,2,5 & 10)
14. Monitor students as they practice conducting/assisting with contrast radiographs. (* 7,8,9,10 & 11)
15. Supervise and evaluate students conducting/assisting with contrast radiographs. (* 12)

CRITERION-REFERENCED MEASURE:

Student must set up the fluoroscopic equipment, adjust the x-ray table, load and mark the film, position the patient, administer the contrast media, make the radiographs and process and evaluate the radiographic images. The radiographic images must demonstrate the required anatomical image with correct exposure and evidence of collimation.

PERFORMANCE GUIDE:

1. Verify patient's identification and physician's orders.
2. Conduct patient into radiographic room:
   A. Greet patient and explain procedure.
   B. Determine that patient is not pregnant.
   C. Explain procedure.
3. Assist patient onto x-ray table.
4. Make preliminary radiographs of parts to be examined, following routine radiograph procedures.
5. Process radiographs.
6. Set up fluoroscopic equipment:
   A. Attach image intensifier, if required.
   B. Place image intensifier for viewing.
7. Adjust x-ray table to correct position (horizontal or vertical).
8. Load film in camera or spot film device.
9. Mark and identify film.
10. Set kvp, MA, and time on control panel.
11. Assemble necessary contrast media and supplies.
12. Explain procedure to the patient.
13. Position the patient on the x-ray table.
14. Introduce the radiologist to the patient.
15. Administer or assist the radiologist with the administration of contrast media as required.

PERFORMANCE GUIDE: (cont.)

16. Assist the radiologist with fluoroscopy and spot filming.
    CAUTION: a. Stand as far away from x-ray table as possible.
    b. Wear lead apron.
    c. Avoid high exposure areas of x-ray room.
17. Make radiographs as directed by radiologist following routine radiographic procedures.
18. Assist patient off x-ray table and provide patient with appropriate post-examination instructions.
19. Process radiography.
20. Evaluate radiographic images to determine if:
    A. Correct anatomical part was demonstrated.
    B. Part, film and central ray were aligned.
    C. Correct exposure factors were used.
    D. Film (right and left of patient) was identified.
    E. Film demonstrated evidence of collimation.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct/assist with contrast radiographs.

ENABLER

1. Review physician's orders for fluoroscopic examination.
2. Recall requirement of shielding devices.
3. Identify anatomical parts.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct/assist with contrast radiographs.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Verified patient's identification and physician's orders.		
2. Conducted patient into radiographic room.		
3. Greeted patient and explained procedure.		
4. Determined that patient was not pregnant.		
5. Explained procedure.		
6. Assisted patient onto x-ray table.		
7. Made preliminary radiographs of parts to be examined, following routine radiograph procedures.		
8. Processed radiographs.		
9. Set up fluoroscopic equipment.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Attached image intensifier, if required.		
11. Placed image intensifier for viewing.		
12. Adjusted x-ray table to correct position (horizontal or vertical).		
13. Loaded film in camera or spot film device.		
14. Marked and identified film.		
15. Set kvp, MA, and time on control panel.		
16. Assembled necessary contrast media and supplies.		
17. Explained procedure to the patient.		
18. Positioned the patient on the x-ray table.		
19. Introduced the radiologist to the patient.		
20. Administered or assisted the radiologists with the administration of contrast media as required.		
21. Assisted the radiologist with fluoroscopy and spot filming.		
22. Made radiographs as directed by radiologist following routine radiographic procedures.		
23. Assisted patient off x-ray table and provided patient with appropriate post-examination instructions.		
24. Processed radiographs.		
25. Evaluated radiographic images to determine if:		
- Correct anatomical part was demonstrated.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
- Part, film and central ray were aligned.	________	________
- Correct exposure factors were used.	________	________
- Film (right and left of patient) was identified.	________	________
- Film demonstrated evidence of collimation.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 172

TASK: Assist with fluoroscopic studies.

STANDARD OF PERFORMANCE OF TASK:

Technologist must prepare the patient to receive a complete fluoroscopic examination by the radiologist. Fluoroscopic study preparations must include positioning patient, obtaining patient's medical information, attaching and positioning accessory attachments, setting and positioning fluoroscopy equipment, and verifying that fluoroscopy is functioning prior to summoning radiologist. The technologist must assist the radiologist and follow instructions without error. Procedure must be recorded on patient's chart.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Fluoroscopic exam room
Patient
Physician's request
Spot films
Lead aprons and gloves
Technologist
Radiologist
Patient's chart

ENABLING OBJECTIVES:

1. Read patient's medical history.
2. Recognize functioning fluoroscopy.
3. Review established department procedures for assisting with fluoroscopic studies.

***RESOURCES:**

1. Department policy/procedure manual
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

4. Ring, E., & McLean, G. (1987). Interventional radiology: Principles and techniques. Boston, MA: Little, Brown and Company.
5. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
6. Wilkins, R., & Viamonte, M. (1982). Interventional radiology. Boston, MA: Blackwell Scientific Publications Ltd.
7. Technique chart.
8. Contrast media.
9. Fluoroscopic examination unit.
10. Radiographic processing equipment.
11. Patient's chart/medical history.
12. Checklist - Assisting with contrast radiographs.

TEACHING ACTIVITIES:

1. Review and demonstrate how to greet patient, and instruct patient to undress and don gown if appropriate. (* 1 & 11)
2. Explain and show students how to assist patient onto fluoroscopic table and explain procedure. (* 1 & 2)
3. Remind students to determine the possibility of pregnancy with female patients and follow department policy if response is positive. (* 1)
4. Identify and show how to attach necessary equipment to table. (* 1,7 & 9)
5. Explain and show students how to position fluoro carriage and ready locks. (* 7 & 9)
6. Demonstrate how to pre-set desired spot film configuration and ascertain that spot film is in fluoro carriage. (* 1,3,5 & 7)
7. Explain and demonstrate how to set grid, mask or compression cone for required exam. (* 3,5,7 & 9)
8. Instruct and demonstrate how to move bucky to foot end of the table and lock. (* 1)
9. Instruct and show how to place fluoro footswitch in convenient location for radiologist. (* 1)
10. Explain and demonstrate how to select and set radiographic generator to appropriate technique. (* 2,4,5 & 6)
11. Explain to students how to reset fluoro timer. (* 9)
12. Demonstrate how to don lead apron. (* 1,2 & 5)
13. Show students how to explain to patient the possibility of injury if patient moves while radiologist is summoned. (* 1,2 & 6)

TEACHING ACTIVITIES: (cont.)

14. Instruct and demonstrate how to dim lights as directed and reload spot film device as necessary. (* 4 & 5)
15. Review how to take overhead radiographs. (* 2,3 & 5)
16. Demonstrate how to assist patient from table and provide post exam instruction/information. (* 1,6 & 7)
17. Review how to prepare films and record procedure on patient's chart. (* 1 & 11)
18. Discuss procedure followed to clean and prepare radiographic examining room. (* 1)
19. Monitor students as they practice assisting with fluoroscopic studies. (* 7,8,9,10 & 11)
20. Supervise and evaluate students assisting with fluoroscopic studies. (* 12)

CRITERION-REFERENCED MEASURE:

The student must position the patient, prepare fluoroscopic equipment, test fluoroscopic unit, reload spot film device, prepare the films, and record the procedure. The fluoroscopic equipment and the patient must be ready for the radiologist and the radiologist's instructions must be followed.

PERFORMANCE GUIDE:

1. Verify physician's orders and patient identification.
2. Greet patient and assist into exam room.
3. Verify that patient is gowned correctly for the procedure.
4. Explain procedure and position patient on flouroscopic table.
   NOTE: If female patient and possibility of pregnancy exists, stop procedure and consult radiologist.
5. Attach any necessary equipment to table (shoulder harness, footboard, etc.).
6. Pull fluoro carriage across patient, relaxing any locks necessary.
7. Pre-set desired spot film configuration and ascertain that spot film is in fluoro carriage.
8. Slide grid, mask, or compression cone forward or backwards, as necessary for exam.
9. Move bucky to foot end of table.
10. Place fluoro footswitch in convenient location for radiologist.
11. Set radiographic generator to appropriate technique.

PERFORMANCE GUIDE: (cont.)

12. Reset fluoro timer.
13. Don lead apron.
14. Fluoro patient as briefly as possible, to ascertain that fluoroscopy is functioning correctly.
15. Inform the patient that you will leave the room momentarily to summon radiologist.
16. Summon radiologist.
17. Introduce contrast to patient and dim overhead lights according to radiologist's preference.
18. Reload spot film device as necessary.
19. Take overhead radiographs as directed by radiologist.
20. Assist patient from table and provide post exam instruction.
21. Prepare films for radiologist's reading.
22. Record procedure on patient's chart.
23. Prepare exam room for next patient.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Assist with fluoroscopic studies.

ENABLER

1. Read patient's medical history.
2. Recognize functioning fluoroscopy.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to assist with fluoroscopic studies.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Verified physician's orders and patient identification.		
2. Greeted patient and assisted into exam room.		
3. Verified that patient was gowned correctly for the procedure.		
4. Explained procedure and positioned patient on fluoroscopic table.		
5. Attached any necessary equipment to table (shoulder harness, footboard, etc.).		
6. Pulled fluoro carriage across patient, relaxing any locks necessary.		
7. Pre-set desired spot film configuration and verified that spot film was in fluoro carriage.		
8. Slid grid, mask, or compression cone forward or backwards, as necessary for exam.		
9. Moved bucky to foot end of table.		

PERFORMANCE DETERMINANTS (cont.)

10. Placed fluoro footswitch in convenient location for radiologist. ________ ________
11. Set radiographic generator to appropriate technique. ________ ________
12. Reset fluoro timer. ________ ________
13. Donned lead apron. ________ ________
14. Fluoroed patient as briefly as possible, to ascertain that fluoroscopy did function correctly. ________ ________
15. Informed the patient that you will leave the room momentarily to summon radiologist. ________ ________
16. Summoned radiologist. ________ ________
17. Introduced contrast to patient and dimmed overhead lights according to radiologist preference. ________ ________
18. Reloaded spot film device as necessary. ________ ________
19. Took overhead radiographs as directed by radiologist. ________ ________
20. Assisted patient from table and provided post exam instruction. ________ ________
21. Prepared films for radiologist's reading. ________ ________
22. Recorded procedure on patient's chart. ________ ________
23. Prepared exam room for next patient. ________ ________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 173

TASK: Perform fistula sinus tract radiographs.

STANDARD OF PERFORMANCE OF TASK:

Radiologist must be assisted in obtaining diagnostic quality radiographs of a fistula or sinus tract. Radiologic technologist must follow radiologist's instruction without error.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's identification
Rad/fluoro unit
Calipers
Technique chart
Film cassettes
Markers
Gonadal shield
Lead aprons
Procedure manual
Exam gloves
Contrast media, syringe
Catheter
Immobilization devices
Film identification apparatus
Radiographic processing equipment

ENABLING OBJECTIVES:

1. Review physician's orders.
2. Recall requirements of shielding devices.
3. Review established department procedures for performing fistula sinus tract radiographs.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

3. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
4. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
5. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
6. Radiographic/fluoroscopic unit.
7. Radiographic processing equipment.
8. Radiographic measuring, marking and shielding devices.
9. Catheter.
10. Syringe with contrast media.
11. Immobilization devices.
12. X-ray film & cassettes.
13. Checklist - Performing fistula sinus tract radiographs.

TEACHING ACTIVITIES:

1. Review and demonstrate how to greet patient, verify patient identification, explain procedure to patient and verify that female patients are not pregnant. (* 1 & 91)
2. Instruct and show students how to make preliminary radiographs of parts to be examined and process radiographs. (* 2,3,4,6 & 7)
3. Explain and demonstrate how to set up fluoroscopic equipment. (* 3,4 & 6)
4. Demonstrate how to load film in camera or spot film device. (* 3,4,6 & 12)
5. Instruct students to mark and identify film. (* 2,3 & 12)
6. Explain and show how to set up KVP, MA and time on control panel. (* 2,3,4 & 6)
7. Show how to assemble contrast media and supplies. (* 1,2,8,9 & 10)
8. Review how to assist patient onto x-ray table. (* 1 & 2)
9. Instruct and show students how to don examination gloves. (* 1,2 & 4)
10. Explain and demonstrate how to select appropriate catheter and insert into sinus tract. (* 3,4 & 9)
11. Explain and demonstrate how to attach contrast media injection device to catheter and inject contrast media. (* 3,4,9 & 10)
12. Discuss how to position part to be examined. (* 1 & 2)

TEACHING ACTIVITIES: (cont.)

13. Explain and show how to adjust central ray, focal film distance and horizontal and vertical shutters. (* 2,3 & 4)
14. Remind students to shield the patient's gondas with lead shield if possible. (* 2,3,4 & 8)
15. Discuss and demonstrate how to immobilize patient with devices and instructions to patient. (* 1,2,5 & 11)
16. Instruct and demonstrate how to remove catheter. (* 2,3,4 & 9)
17. Demonstrate how to assist patient off table and provide post examination instructions. (* 1,2 & 5)
18. Review how to process radiographs. (* 1,2,3,4 & 7)
19. Instruct students to return film to radiologist. (* 1,2,4 & 12)
20. Monitor students as they practice performing fistula sinus tract radiography. (* 6,7,8,9,10,11 & 12)
21. Supervise and evaluate students performing fistula sinus tract radiography. (* 13)

CRITERION-REFERENCED MEASURE:

The student must make and process preliminary radiographs, set up the fluoroscopic equipment, load and mark the film, inject the contrast media, position the patient, adjust the central ray and the focal-film distance, collimate the beam, shield the patient, make the exposure, remove the catheter and process the radiographs.

PERFORMANCE GUIDE:

1. Verify patient's identification and physician's orders.
2. Conduct patient into radiographic room.
3. Assist patient onto x-ray table:
   A. Greet patient.
   B. Determine that patient is not pregnant.
   C. Explain procedure.
4. Make preliminary radiographs (scout films) of parts to be examined, following routine radiographic procedures.
5. Process radiographs.
6. Set up fluoroscopic equipment.
7. Load film in camera or spot film device.
8. Mark and identify film.
9. Set KVP', MA, and time on control panel.
10. Assemble contrast media and supplies.
11. Position the patient on the x-ray table.
12. Introduce the radiologist to the patient.

PERFORMANCE GUIDE: (cont.)

13. Put on gloves.
14. Select appropriate catheter based on size of sinus tract.
15. Insert catheter into sinus tract.
16. Attach contrast media injection device to catheter.
17. Inject contrast media through catheter as directed.
18. Position part to be examined.
19. Adjust central ray to align with film and part to be examined.
20. Adjust focal-film distance.
21. Adjust horizontal and vertical shutters to collimate beam.
22. Shield the patient's gonads with lead shield, if it doesn't interfere with the examination.
23. Immobilize part to be examined with devices or by instructions to patient.
24. Make exposure.
    CAUTION: Be sure anyone assisting with the patient is shielded and that persons not needed leave the room.
25. Remove catheter.
26. Assist patient off table and provide patient with appropriate post examination instructions.
27. Process radiographs.
28. Return films to radiologist. Make additional films, if requested by radiologist.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Perform fistula sinus tract radiographs (x-ray).

ENABLER

1. Review physician's orders.
2. Recall requirements of shielding devices.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform fistula sinus tract radiographs.

PERFORMANCE DETERMINANTS	YES	NO
1. Verified patient's identification and physician's orders.		
2. Conducted patient into radiographic room.		
3. Assisted patient onto x-ray table:		
- Greeted patient.		
- Determined that patient was not pregnant.		
- Explained procedure.		
4. Made preliminary radiographs (scout films) of parts to be examined, following routine radiographic procedures.		
5. Processed radiographs.		
6. Set up fluoroscopic equipment.		
7. Loaded film in camera or spot film device.		
8. Marked and identified film.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Set up KVP, MA, and time on control panel.		
10. Assembled contrast media and supplies.		
11. Positioned the patient on the x-ray table.		
12. Introduced the radiologist to the patient.		
13. Put on gloves.		
14. Selected appropriate catheter based on size of sinus tract.		
15. Inserted catheter into sinus tract.		
16. Attached contrast media injection device to catheter.		
17. Injected contrast media through catheter as directed.		
18. Positioned part to be examined.		
19. Adjusted central ray to align with film and part to be examined.		
20. Adjusted focal-film distance.		
21. Adjusted horizontal and vertical shutters to collimate beam.		
22. Shielded the patient's gonads with lead shield.		
23. Immobilized part to be examined with devices or by instructions to patient.		
24. Made exposure.		
25. Removed catheter.		
26. Assisted patient off table and provided patient with appropriate post examination instruction.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
27. Processed radiographs.		
28. Returned films to radiologist and made additional films, if requested by radiologist.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 174

TASK: Conduct cardiac catheterization and angiocardiogram examination.

STANDARD OF PERFORMANCE OF TASK:

The patient must be positively identified and the procedure orders verified from the patient's chart. A signed consent form must be present or obtained before proceeding. Patient care and sterile technique must be observed throughout the procedure. Equipment safety must be maintained throughout the procedure.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Patient's identification bracelet
Consent form
Angiographic suite
Contrast media
Power injector
Radiographic unit
Life support equipment
Emergency drug supply
Sterile gloves, gowns
Sterile prep trays
Angiocath dressing, bandages, sterile drapes

ENABLING OBJECTIVESF

1. **Review physician,s orders.**
2. **Recall purpose of a consent form.**
3. **Recall sterilization requirements.**
4. **Communicate with physician/team leader.**
5. **Review established department procedures for catheterization and angiocardiogram.**

***RESOURCES:**

1. Department policy/procedure manual.

***RESOURCES:** (cont.)

2. Abrams, H. (1982). Abrams angiography: Vascular and interventional radiograph (3rd ed). Boston, MA: Little, Brown and Company.
3. Kruger, R., & Riederer, S. (1984). Basic concepts of ditial subtraction angiography. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Miller, S. (1984). Cardiac angiography. Boston, MA: Little, Brown and Company.
5. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
6. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
7. Radiographic unit.
8. Angiographic suite.
9. Power injector/contrast media.
10. Sterile prep tray/contrast media.
11. Consent form.
12. Checklist - Conduct cardiac catheterization and angiocardiogram examination.

TEACHING ACTIVITIES:

1. Review how to verify patient identification, signed consent form, and to ensure that proper pre-operative procedure and medication have been administered. (* 1,5,6 & 11)
2. Instruct and show the students how to inspect the suite to ensure that all the necessary supplies and equipment are present. (* 2,3,4,7 & 8)
3. Explain and demonstrate how to position the patient on the imaging table per the team leader's direction. (* 2,7 & 8)
4. Instruct and demonstrate how to set up sterile trays/equipment, establish sterile fields, prep induction site and ready imaging equipment. (* 3,4,9 & 10)
5. Explain and show the students how to pre-load the angio injection device with contrast media. (* 2,9 & 10)
6. Discuss how to review the images to ensure diagnostic quality and accuracy. (* 1,5 & 6)
7. Instruct and show students how to remove the angiocatheter and apply pressure to the injection site for a minimum of five minutes. (* 2,3 & 4)
8. Explain and demonstrate how to apply a secure pressure bandage. (* 1,5 & 6)

TEACHING ACTIVITIES: (cont.)

9. Explain the importance of patient being monitored for eight hours and how patient should be returned to his/her room. (* 2,3 & 4)
10. Review department procedure regarding disposal of single use items. (* 1,5 & 6)
11. Explain and demonstrate how to return room to pre-operative condition. (* 8)
12. Monitor students as they practice conducting cardiac catheterization and angiocardiogram examination. (* 7,8,9.10 & 11)
13. Supervise and evaluate students conducting cardiac catheterization and angiocardiogram examination. (* 12)

CRITERION-REFERENCED MEASURE:

The student must ensure that all pre-operative procedures have been completed, position the patient, operate the fluoroscopy, initiate and review the diagnostic images, remove the angiocartheter, apply a secure pressure bandage and monitor the patient.

PERFORMANCE GUIDE:

1. Verify patient's identification, consent form is signed, and procedure to be performed is correct.
2. Check patient's chart to ensure proper pre-operative procedures and medication have been administered.
3. Notify the team leader that the patient has arrived in the department to allow the leader to explain the procedure.
4. Check the suite to ensure that all the necessary supplies and equipment are present. Check with the team leader to determine if there are any special requirements.
5. Inspect the suite for readiness:
    A. Equipment is operating properly in accordance with specifications.
    B. Establish equipment image settings, placement.
    C. Ensure necessary accessory equipment is in the ready state.
6. Notify team of transport of patient to suite.
7. Position the patient on the imaging table per the team leader's direction.

PERFORMANCE GUIDE: (cont.)

8. Assume assigned position:
    - A. Set up sterile trays, equipment.
    - B. Establish sterile fields.
    - C. Prep induction site.
    - D. Ready imaging equipment, take preliminary film as required, stand by.

      NOTE: The physician in charge will induce the angiocath into the proposed site.
9. Visualization of position of the tip will be monitored via the fluoroscopy until such time as the injection site has been reached in relation to the anatomical part to be evaluated.
10. Preload the angio injection device with contrast media.

    NOTE: A signal by the team leader will signify the initiation of the diagnostic images.
11. Review the images to ensure diagnostic quality and accuracy.
12. Remove the angiocatheter and apply pressure to the injection site for a minimum of five minutes.
13. Apply a secure pressure bandage, return the patient to his/her room, and monitor the patient for at least eight hours.
15. Return the room to a pre-operative condition, discard all single use items, return all non-sterile reusable items to proper personnel for cleaning.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct cardiac catheterization and angiocardiogram examination.

ENABLER

1. Review physician's orders.
2. Recall purpose of a consent form.
3. Recall sterilization requirements.
4. Communicate with physician/team leader.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct cardiac catheterization and angiocardiogram examination.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Verified patient's identification, consent form was signed, and procedure to be performed was correct.	______	______
2.	Checked patient's chart to ensure proper pre-operative procedures and medication was administered.	______	______
3.	Notified the team leader that the patient had arrived in the department to allow the leader to explain the procedure.	______	______
4.	Checked the suite to ensure that all the necessary supplies and equipment were present. Checked with the team leader to see if there were any special requirements.	______	______
5.	Inspected the suite for readiness:		
	- Equipment was operating properly in accordance with specifications.	______	______
	- Established equipment image settings, placement.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
5. Inspected the suite for readiness: (cont.)		
- Ensured necessary accessory equipment was in the ready state.		
6. Notified team of transport of patient to suite.		
7. Positioned the patient on the imaging table per the team leader's direction.		
8. Assumed assigned position:		
- Set up sterile trays, equipment.		
- Established sterile fields.		
- Prepped induction site.		
- Readied imaging equipment, took preliminary film as required, stood by.		
9. Visualized position of the tip via the fluoroscopy until the injection site was reached in relation to the anatomical part to be evaluated.		
10. Preloaded the angio injection device with contrast media.		
11. Reviewed the images to ensure diagnostic quality and accuracy.		
12. Removed the angiocartheter and applied pressure to the injection site for a minimum of five minutes.		
13. Applied a secure pressure bandage, returned the patient to his/her room and monitored the patient for at least 8 hours.		
15. Returned the room to a pre-operative condition, discarded all single use items, returned all non-sterile reusable items to proper personnel for cleaning.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 175

TASK: Conduct arteriography examination.

STANDARD OF PERFORMANCE OF TASK:

Fluorographic equipment must be prepared, automatic injector loaded, and radiographic projection performed. Aseptic technique and radiation safety must be strictly adhered to at all times. Radiologic technologist must follow the radiologist's instructions without error.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Arteriogram procedure
Patient
Fluorographic unit
Automatic injector
Automatic film changer
Sterile tray
Crash cart

ENABLING OBJECTIVES:

1. Review physician's orders.
2. Recall sterilization requirements.
3. Review established department procedures for arteriography examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Mistretta, C., Crummy, A., Strother, C., & Sackett, J. (1981). Digital subtraction anteriography: An application of computerized fluoroscopy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

5. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
6. Moss, A., Rin, E., & Higgins, C. (1986). NMR, CT and interventional radiology. St. Louis, MO: C.V. Mosby Company.
7. Fluorographic unit.
8. Technique/procedure manual.
9. Automatic injector.
10. Sterile tray.
11. Crash chart.
12. Checklist - Conducting arteriography examination.

TEACHING ACTIVITIES:

1. Instruct students to verify patient's identification, and check patient's chart for history of allergies. (* 1 & 3)
2. Discuss and demonstrate how to prepare fluorographic equipment. (* 2,4,5,6 & 7)
3. Show students how to cover fluoro-tower and handle with sterile drape. (* 2,4,5 & 7)
4. Explain and demonstrate how to load and position automatic film changer. (* 2,3,4 & 6)
5. Explain and demonstrate how to load automatic injector using sterile technique. (* 3 & 9)
6. Review and show how to transport patient to radiographic room and assist onto x-ray tables. (* 1 & 3)
7. Instruct and demonstrate how to measure thickness of part to be examined. (* 2 & 4)
8. Explain and demonstrate how to check technique chart to determine exposure factors. (* 1 & 8)
9. Explain and show how to select KVP, MA, and time on control panel. (* 2,3 & 4)
10. Show students how to program automatic film changer for preliminary film. (* 6)
11. Review and demonstrate how to make preliminary films and process and evaluate the film. (* 4 & 6)
12. Explain and show how to program film changes for serial filming. (* 2,3 & 4)
13. Instruct students to set up sterile tray using aseptic technique. (* 6 & 10)
14. Explain and demonstrate how to prepare injection site using prescribed method. (* 1,5 & 8)
15. Discuss and show how to drape patient according to radiologist's instruction. (* 3)

TEACHING ACTIVITIES: (cont.)

16. Explain how to assist radiologist as required in inserting needle or catheter and monitor patient's vital signs throughout the procedure. (* 6 & 8)
17. Review and demonstrate how to position patient for required radiographic projection. (* 3)
18. Explain and show how to connect high pressure connector from syringe to needle or catheter. (* 3,6 & 7)
19. Demonstrate how to arm the injector. (* 2 & 6)
20. Instruct students to initiate injection and serial exposures on radiologist's signal. (* 6,7,8 & 9)
21. Review how to process radiographs. (* 3 & 5)
22. Explain and demonstrate how to assist with the removal of needles or catheters. (* 6)
23. Review and show how to record data pertinent to the procedure according to department procedures. (* 1,3 & 5)
24. Explain and demonstrate how to release patient to qualified personnel for observation. (* 1)
25. Review procedure for processing radiographs. (* 3,4,5 & 8)
26. Monitor student as they practice conducting arteriography examination. (* 7,8,9,10 & 11)
27. Supervise and evaluate students conducting arteriography examination. (* 12)

CRITERION-REFERENCED MEASURE:

The student must prepare the fluorographic equipment, load the automatic injector, determine and set exposure factors, make and process preliminary film, program the film changer, assist in insertion of needle or catheter, position the patient, initiate the injection and exposure, process the radiographs, assist with removal of needles or catheters and record pertinent data. The image must demonstrate the desired anatomical parts and patient care and sterile techniques must be observed.

PERFORMANCE GUIDE:

1. Verify patient identification and check patient's chart for a history of allergies.
2. Check orders for specific type of examination.
3. Prepare fluorographic equipment.
4. Cover fluoro-tower and handle with sterile drape.
5. Load and position automatic film changer.

PERFORMANCE GUIDE: (cont.)

6. Load automatic injector using sterile technique:
    - A. Attach ground wire to a metal ground, such as bottom of table.
    - B. Attach syringe to injector.
    - C. Attach connector tubing to syringe.
    - D. Insert connector tubing into contrast media container.
    - E. Press load switch until syringe is full.
    - F. Remove any air bubbles from syringe.
    - G. Remove tubing from syringe and container.
    - H. Set manual stop on syringe.
    - I. Select flow rate and injection time on control panel.
    - J. Attach high pressure connector to syringe.
7. Transport patient into radiographic room.
8. Assist patient onto x-ray table.
9. Measure thickness of part to be examined.
10. Check technique chart to determine exposure factors.
11. Select KVP, MA, and time on control panel.
12. Program automatic film changer for preliminary film.
13. Make preliminary film, using routine radiograph procedures.
14. Process and evaluate the film.
15. Program film changer for serial filming.
16. Set up sterile tray using aseptic technique.
17. Prepare injection site using prescribed method.
18. Drape patient according to radiologist's instructions.
19. Assist radiologist as required in inserting needle or catheter.
    CAUTION: Monitor patient's vital signs throughout the procedure.
20. Position patient for required radiographic projection.
21. Connect high pressure connector from syringe to needle or catheter.
22. Arm the injector.
23. Initiate injection and serial exposures on radiologist's signal.
24. Process radiographs.
25. Assist with the removal of needles or catheters.
26. Record data pertinent to the procedure according to department procedures:
    - A. Amount and kind of contrast media.
    - B. When injected.
    - C. Length of examination.
    - D. Patient's condition after examination.

PERFORMANCE GUIDE: (cont.)

27. Release patient to qualified personnel for observation.
28. Process radiographs.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct arteriography examination.

ENABLER

1. Review physician's orders.
2. Recall sterilization requirements.
3. Review established department procedures for arteriography examination.

STUDENT'S NAME ____________________ **DATE** __________

EVALUATOR'S NAME ____________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct arteriography examination.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified patient identification and checked patient's chart for a history of allergies.		
2.	Checked orders for specific type of examination.		
3.	Prepared fluorographic equipment.		
4.	Covered fluoro-tower and handled with sterile drape.		
5.	Loaded and positioned automatic film changer.		
6.	Loaded automatic injector using sterile technique.		
7.	Attached ground wire to a metal ground, such as bottom of table.		
8.	Attached syringe to injector.		
9.	Attached connector tubing to syringe.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
10.	Inserted connector tubing into contrast media container.	________	________
11.	Pressed load switch until syringe was full.	________	________
12.	Removed any air bubbles from syringe.	________	________
13.	Removed tubing from syringe and container.	________	________
14.	Set manual stop on syringe.	________	________
15.	Selected flow rate and injection time on control panel.	________	________
16.	Attached high pressure connector to syringe.	________	________
17.	Transported patient into radiographic room.	________	________
18.	Assisted patient onto x-ray table.	________	________
19.	Measured thickness of part to be examined.	________	________
20.	Checked technique chart to determine exposure factors.	________	________
21.	Selected KVP, MA, and time on control panel.	________	________
22.	Programmed automatic film changer for preliminary film.	________	________
23.	Made preliminary film, using routine radiograph procedures.	________	________
24.	Processed and evaluated the film.	________	________
25.	Programmed film changer for serial filming.	________	________
26.	Set up sterile tray using aseptic technique.	________	________
27.	Prepared injection site using prescribed method.	________	________

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
28.	Draped patient according to radiologist's instructions.		
29.	Assisted radiologist as required in inserting needle or catheter.		
30.	Positioned patient for required radiographic projection.		
31.	Connected high pressure connector from syringe to needle or catheter.		
32.	Armed the injector.		
33.	Initiated injection and serial exposures on radiologist's signal.		
34.	Processed radiographs.		
35.	Assisted with the removal of needles or catheters.		
36.	Recorded data pertinent to the procedure according to department procedures.		
37.	Released patient to qualified personnel for observation.		
38.	Processed radiographs.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 176

TASK: Perform venography examination.

STANDARD OF PERFORMANCE OF TASK:

Assist radiologist in obtaining diagnostic quality venograms. Radiologist's instructions must be followed without error.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS radiographer catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's requisition/chart
Caliper
Patient identification
Technique chart
Stationary x-ray unit
Film cassettes
Film identification apparatus
Lead aprons
Markers (right and left)
Gonadal shield
Immobilization device(s)
Procedure manual
Intravenous infusion set-up
Contrast media
Tourniquets
Normal saline
Radiographic processing equipment
NOTE: Crash cart must be readily available in case of adverse contrast reaction.

ENABLING OBJECTIVES:

1. Review physician's orders.
2. Read patient's medical history.
3. Apply dressing to injection puncture wound.
4. Review established department procedure for performing venographic examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Moss, A., Rin, E., & Higgins, C. (1986). NMR, CT and interventional radiology. St. Louis, MO: C.V. Mosby Company.
5. Ring, E., & McLean, G. (1987). Interventional radiology: Principles and techniques. Boston, MA: Little, Brown and Company.
6. Wilkins, R., & Viamonte, M. (1982). Interventional radiology. Boston, MA: Blackwell Scientific Publications Ltd.
7. Stationary x-ray unit.
8. Intravenous infusion set-up.
9. Radiation marking and shielding.
10. Technique/procedure manual.
11. Radiographic processing equipment.
12. Consent form.
13. Checklist - Performing venography examination.

TEACHING ACTIVITIES:

1. Discuss necessary equipment and supplies and demonstrate how to assemble. (* 1,3 & 10)
2. Explain and demonstrate how to prepare contrast media for intravenous injection. (* 3,4,5 & 6)
3. Instruct and demonstrate how to determine radiographic projections needed to demonstrate requested anatomy. (* 3,4,5 & 6)
4. Explain and show students how to greet patient, explain procedure, check for signed consent form and instruct patient to remove any radio-opaque objects. (* 1,2,3 & 12)
5. Review and demonstrate how to assist patient onto x-ray table. (* 1 & 3)
6. Explain and demonstrate how to measure thickness of part to be examined. (* 1,2 & 3)
7. Explain and demonstrate how to check technique chart to determine exposure factor. (* 1 & 10)
8. Demonstrate how to set unit for proper KVP, MA and time exposure. (* 1,3 & 10)
9. Review and show how to set up film changes on selected film and place in bucky tray. (* 1,3 & 10)

TEACHING ACTIVITIES: (cont.)

10. Review department policy and demonstrate how to identify and mark film. (* 1,2,3 & 11)
11. Discuss and demonstrate how to position part to be examined. (* 1,3 & 10)
12. Review how to make, process and evaluate preliminary radiograph. (* 1,2,3,7 & 10)
13. Explain and demonstrate how to assist radiologist with injection of contrast media. (* 4,5,6,7,8 & 10)
14. Explain and demonstrate how to make multiple exposures when requested and process. (* 3,4,5 & 6)
15. Instruct students to record pertinent data according to department procedures. (* 1,2,3 & 10)
16. Explain and show how to remove needle utilizing sterile technique. (* 4,5 & 6)
17. Discuss and demonstrate how to give patient post exam information/instructions. (* 1,2 & 3)
18. Monitor students as they practice performing venography examination. (* 7,8,9,10,11 & 12)
19. Supervise and evaluate students performing venography examination. (* 13)

CRITERION-REFERENCED MEASURE:

The student must prepare the contrast media, determine and set the exposure factors, select and set up film, mark film, position part, take radiograph, process and evaluate preliminary radiographs, inject the contrast media, make multiple exposures, process the radiographs and record pertinent data. The images must demonstrate the desired anatomical part and patient care must be observed.

PERFORMANCE GUIDE:

1. Verify patient identification and physician's order.
2. Assemble necessary equipment and supplies according to hospital checklist.
3. Prepare contrast media for IV injection.
4. Determine radiographic projections needed to demonstrate requested anatomy:
   A. Obtain patient's medical history pertinent to examination.
   B. Check procedure manual.
5. Conduct patient into radiographic room:
   A. Greet patient and explain procedure.

PERFORMANCE GUIDE: (cont.)

5. Conduct patient into radiographic room: (cont.)
   B. Instruct patient to remove any radio-opaque objects from area to be examined.
   C. Check for signed consent form.
6. Assist patient onto x-ray table.
7. Measure thickness of part to be examined.
8. Check technique chart to determine exposure factors.
9. Set KVP, MA, and time on control panel.
10. Set up film changers or select film and place in Bucky tray.
11. Identify and mark film.
12. Position part to be examined.
13. Make preliminary radiographs, following procedures for making routine radiographs.
14. Process and evaluate radiographs.
15. Assist radiologist with injection of contrast media as requested.
16. Make multiple exposures as radiologist requests.
17. Process radiographs.
18. Record data pertinent to the procedure, according to department procedures.
19. Present film to radiologist and obtain additional views, if requested.
20. Remove needle from puncture site and apply dressing.
21. Provide patient with post exam instructions.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Perform venography examination.

ENABLER

1. Review physician's orders.
2. Read patient's medical history.
3. Apply dressing to injection puncture wound.
4. Review established department procedure for performing venographic examination.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform venography examination

PERFORMANCE DETERMINANTS	YES	NO
1. Verified patient identification and physician's order.		
2. Assembled necessary equipment and supplies according to hospital checklist.		
3. Prepared contrast media for IV injection.		
4. Determined radiographic projections needed to demonstrate requested anatomy.		
5. Obtained patient's medical history pertinent to examination.		
6. Checked procedure manual.		
7. Conducted patient into radiographic room.		
8. Greeted patient and explained procedure.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Instructed patient to remove any radio-opaque objects from area to be examined.		
10. Checked for signed consent form.		
11. Assisted patient onto x-ray table.		
12. Measured thickness of part to be examined.		
13. Checked technique chart to determine exposure factors.		
14. Set kvp, MA, and time on control panel.		
15. Set up film changers or selected film and place in Bucky tray.		
16. Identified and marked film.		
17. Positioned part to be examined.		
18. Made preliminary radiographs, following procedures for making routine radiographs.		
19. Processed and evaluated radiographs.		
20. Assisted radiologist with injection of contrast media as requested.		
21. Made multiple exposures as radiologist requests.		
22. Processed radiographs.		
23. Recorded data pertinent to the procedure, according to department procedures.		
24. Presented film to radiologist and obtained additional views, if requested.		
25. Removed needle from puncture site and apply dressing.		
26. Provided patient with post exam instructions.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 177

TASK: Assist with lymphangiogram.

STANDARD OF PERFORMANCE OF TASK:

The radiologic technologist must assist the physician in the preparing of the injection site, the cut-down and injection of contrast material. After injection of contrast material, the technologist must obtain diagnostic radiographs of the lymphatic system. Patient must be exposed to a minimum of radiation exposure and aseptic technique must be maintained.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Film/cassettes
Markers
Radiographic exposure room
Calipers
Technique chart
Crash cart
Oily contrast media (ethiodol)
Razor (cut down tray)
Radiographic processing equipment
Consent forms
Injector

ENABLING OBJECTIVES:

1. Recall skin preparations required for cut-down/injections.
2. Recall purpose of consent form.
3. Review established department procedure for performing lymphangiograms.

*RESOURCES:

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

*RESOURCES: (cont.)

3. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
4. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
5. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
6. Radiographic unit.
7. Technique chart.
8. Oily contrast media.
9. Radiographic processing equipment.
10. Radiographic film and cassettes.
11. Patient consent form.
12. Checklist - Assisting with lymphangiograms.

TEACHING ACTIVITIES:

1. Discuss and show how to assemble supplies and prepare examination room. (* 1 & 2)
2. Explain and demonstrate how to greet patient and instruct patient to remove clothing and jewlery and don gown. (* 1,2 & 3)
3. Show students how to explain procedure to patient and verify patient signed consent form. Instruct student to check with female patient to determine that she is not pregnant. (* 1,2,5 & 11)
4. Review and demonstrate how to assist patient onto radiographic table. (* 1,2 & 6)
5. Instruct and show students how to shave injection site and prep skin for cut-down/injections. (* 1,2 & 8)
6. Discuss and demonstrate how to assist physician with cut-down and injections. (* 2,3 & 4)
7. Instruct students to make radiographs within the first hour after injection of ethiodol is complete. (* 2,3 & 4)
8. Review department protocol and physician's order and demonstrate how to determine views and intervals required. (* 1,2,3 & 4)
9. Explain and demonstrate how to provide patient with post-exam instructions and escort out of department. (* 1,2 & 5)
10. Instruct students how to make second series of radiographs 24 hours later. (* 1 & 2)

TEACHING ACTIVITIES: (cont.)

11. Review and demonstrate how to make tomography and magnification views. (* 2,3 & 4)
12. Monitor students as they practice assisting with lymphagiograms. (* 6,7,8,9,10 & 11)
13. Supervise and evaluate students assisting with lymphangiograms. (* 12)

CRITERION-REFERENCED MEASURE:

The student must prepare the room, position and prepare the patient, determine and set exposure factor, make the radiographic images and provide patient care. The radiographic images must demonstrate diagnostic images of the lymphatic system and patient care must be provided.

PERFORMANCE GUIDE:

1. Assemble all supplies and prepare room.
2. Greet patient and instruct patient to remove clothing, jewelry, and don gown.
3. Escort patient onto radiographic table, explain procedure and have patient sign consent form. Ascertain that patient is not pregnant.
4. Shave injection site and prep skin for cut-down/ injection(s).
5. Summon physician, introduce physician to patient and assist physician with cut-down and injection(s).
6. Make radiographs within the first hour after injection of ethiodol is complete. Follow physician's orders and department protocol for views and intervals required.
   NOTE: The exposure factors employed for lymphangio graphic studies are the same as those used for bone studies of the respective regions.
7. Provide patient with post-exam instructions and escort out of department.
8. Make a second series of radiographs 24 hours later.
   NOTE: Second series may include tomography and magnification views.

CHECKLIST

DUTY Performing Testing Therapeutic Procedures

TASK Assist with lymphangiogram.

ENABLER

1. Recall skin preparations required for cutdown/injections.
2. Recall purpose of consent form.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to assist with lymphangiogram.

PERFORMANCE DETERMINANTS	YES	NO
1. Assembled all supplies and prepared room.	______	______
2. Greeted patient and instructed patient to remove clothing, jewelry, and don gown.	______	______
3. Escorted patient onto radiographic table, explained procedure and had patient sign consent form. Verified that patient was not pregnant.	______	______
4. Shaved injection site and prepped skin for cut-down/injection(s).	______	______
5. Summoned physician, introduced physician to patient and assisted physician with cut-down and injection(s).	______	______
6. Made radiographs within the first hour after injection of ethiodol was completed.	______	______
7. Provided patient with post-exam instructions and escorted out of department.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
8. Made a second series of radiographs 24 hours later.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 178

TASK: Conduct myelogram examination.

STANDARD OF PERFORMANCE OF TASK:

Radiologist must be assisted in obtaining diagnostic myelogram. The radiologic technologist must follow the radiologist's instructions without error.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's requisition/chart
Caliper
Patient identification
Technique chart
Film cassettes
Gonadal shield
Markers (right and left)
Lead aprons
Immobilization device(s)
Procedure manual
Rad/fluoro unit
Sterile gloves
Myelogram tray
Grid cassette
Film holder
Lead gloves
Contrast media
Stretcher
Film identification apparatus
Consent form
Radiographic processing equipment
Padded shoulder support and foot board
NOTE: Crash cart must be readily available in case of adverse contrast reaction.

ENABLING OBJECTIVES:

1. Review physician's orders.
2. Recall purpose of consent form.

ENABLING OBJECTIVES: (cont.)

3. Recall purpose of a crash cart.
4. Review established department procedures for conducting a myelogram examination.

*RESOURCES:

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
5. Shapiro, R. (1984). Myelography (4th ed.). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Fluoroscopic unit.
7. Radiographic processing equipment.
8. Myelogram tray.
9 Contrast media.
10. Radiation markers and shielding.
11. Patient's chart.
12. Techniques/procedure manual.
13. Checklist - Conducting myelogram examination.

TEACHING ACTIVITIES:

1. Instruct and demonstrate how to prepare contrast media for injection. (* 3,8 & 9)
2. Explain and demonstrate how to set up myelogram tray using aseptic techniques. (* 1 & 8)
3. Instruct and show students how to set up fluoroscopic equipment. (* 3,4,5 & 6)
4. Demonstrate to students how to set up myelographic stop. (* 2,3 & 5)
5. Discuss and show students how to greet patient, explain procedure, obtain signed procedure consent form and instruct patient to remove radio-opaque objects. (* 1,2,11 & 12)
6. Review and demonstrate how to assist patient onto x-ray table. (* 1 & 3)
7. Discuss procedures for making routine radiographs. (* 3 & 4)
8. Demonstrate how to make preliminary radiographs and process radiographs. (* 1,3,4,6 & 7)

TEACHING ACTIVITIES: (cont.)

9. Explain and show students how to position patient for spinal puncture as directed by radiologist. (* 5,6 & 8)
10. Instruct and show students how to place padded shoulder support and foot board. (* 12)
11. Discuss and demonstrate how to assist physician with administration of contrast media, fluoroscopy and spot filming. (* 3,5,8,8 & 12)
12. Demonstrate how to make requested radiographs and process radiographs. (* 3 & 4)
13. Discuss and show students how to assist with the removal of contrast media if necessary. (* 5 & 9)
14. Instruct students how to label and forward spinal fluid specimen. (* 1,5,8,10 & 12)
15. Explain and demonstarate how to transfer patient to cart positioned according to contrast media used. (* 3,5,6 & 9)
16. Discuss and show students how to provide patient/care givers with pertinent post exam instructions. (* 1)
17. Monitor students as they practice conducting myelogram examination. (* 6,7,8,9,10,11 & 12)
18. Supervise and evaluate students conducting myelogram examination. (* 13)

CRITERION-REFERENCED MEASURE:

The student must make preliminary radiographs, position the patient, assist the physician with administering the contrast media and with fluoroscopy and spot filming, make and process radiographs, assist with the removal of the contrast media, label the specimen and care for the patient. The radiographs must demonstrate the desired images and patient care procedures must be observed.

PERFORMANCE GUIDE:

1. Verify patient identification and physician's orders.
2. Prepare contrast media for injection.
3. Set up myelogram tray, using sterile technique.
4. Set up fluoroscopic equipment.
   CAUTION: Set myelographic stop.
5. Conduct patient into radiographic room:
   A. Greet patient.
   B. Explain procedure.
   C. Instruct patient to remove any radio-opaque objects from area to be examined.

PERFORMANCE GUIDE: (cont.)

5. Conduct patient into radiographic room: (cont.)
   D. Obtain signed procedure consent form.
6. Assist patient onto x-ray table.
7. Make preliminary radiographs following procedures for making routine radiographs.
8. Process radiographs.
9. Position patient for spinal puncture as directed by radiologist.
10. Place padded shoulder support in proper position and foot board.
11. Assist physician with administration of contrast media.
12. Assist physician with fluoroscopy and spot filming.
13. Make radiographs as requested by physician, following procedures for making routine radiographs.
14. Process radiographs.
15. Assist with the removal of contrast media, if necessary.
16. Label and forward spinal fluid specimen as requested by the physician.
17. Transfer patient to cart and position according to contrast media used:
   A. Oily organic iodine - keep patient flat for 12 to 24 hours.
   B. Water soluble organic iodine - Keep patient's head elevated 20-30 degrees for 8 hours. Keep patient passive for 24 hours and have him/her drink a lot of liquids.
18. Provide patient/care givers with pertinent post exam instructions.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct myelogram examination.

ENABLER

1. Review physician's orders.
2. Recall purpose of consent form.
3. Recall purpose of a crash cart.

STUDENT'S NAME ______________________ **DATE** __________

EVALUATOR'S NAME ______________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct myelogram examination.

PERFORMANCE DETERMINANTS	YES	NO
1. Verified patient identification and physician's orders.		
2. Prepared contrast media for injection.		
3. Set up myelogram tray, using sterile technique.		
4. Set up fluoroscopic equipment.		
5. Conducted patient into radiographic room:		
- Greeted patient.		
- Explained procedure.		
- Instructed patient to remove any radio-opaque objects from area to be examined.		
- Obtained signed procedure consent form.		
6. Assisted patient onto x-ray table.		
7. Made preliminary radiographs following procedures for making routine radiographs.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
8.	Processed radiographs.	________	________
9.	Positioned patient for spinal puncture as directed by radiologist.	________	________
10.	Placed padded shoulder support and foot board in proper position.	________	________
11.	Assisted physician with administration of contrast media.	________	________
12.	Assisted physician with fluoroscopy and spot filming.	________	________
13.	Made radiographs as requested by physician, following procedures for making routine radiographs.	________	________
14.	Processed radiographs.	________	________
15.	Assisted with the removal of contrast media, if necessary.	________	________
16.	Labeled and forwarded spinal fluid specimen as requested by the physician.	________	________
17.	Transferred patient to cart and positioned according to contrast media used:		
	- Oily organic iodine - Kept patient flat for 12 to 24 hours.	________	________
	- Water soluble organic iodine - Kept patient's head elevated 20-30 degrees for 8 hours. Kept patient passive for 24 hours and had him/her drink a lot of liquids.	________	________
18.	Provided patient/care givers with pertinent post exam instructions.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 179

TASK: Assist with arthrogram examination.

STANDARD OF PERFORMANCE OF TASK:

Radiographic room must be prepared and physician must be assisted with the sterile injection of contrast media into a joint or joints. Technologist must assist with subsequent fluoroscopy and overhead radiographs of the joints.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Radiographic/fluoroscopic room
Film/cassettes
Radiographic processing facilities
Arthrogram tray
Contrast media
Stress device
Lead gloves/aprons
Physician's order
Consent form
Razor
Injectable anesthetic
Instrument cart or Mayo stand

ENABLING OBJECTIVES:

1. Review physician's orders.
2. Recall purpose of consent form.
3. Review established department procedures for an arthrogram examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

*RESOURCES: (cont.)

4. Moss, A., Rin, E., & Higgins, C. (1986). NMR, CT and interventional radiology. St. Louis, MO: C.V. Mosby Company.
5. Ring, E., & McLean, G. (1987). Interventional radiology: Principles and techniques. Boston, MA: Little, Brown and Company.
6. Wilkins, R., & Viamonte, M. (1982). Interventional radiology. Boston, MA: Blackwell Scientific Publications Ltd.
7. Radiographic/fluorscopic room.
8. Radiographic unit.
9. Arthrogram tray.
10. Contrast media.
11. Physician's orders and consent form.
12. Injectable anesthetic.
13. Checklist - Assisting with arthrogram examination.

TEACHING ACTIVITIES:

1. Review and show students how to greet patient and instruct patient to remove clothing and don gown. (* 1,2 & 11)
2. Explain and demonstrate how to assist patient onto table, explain procedure, obtain signed consent form, and verify that female patients are not pregnant. (* 1,2 & 11)
3. Review department protocol, position patient and scout films. (* 3)
4. Instruct students to obtain supplies for injection site preparation. (* 9 & 10)
5. Explain and demonstrate how to prepare injection site preparation. (* 4,5,6 & 12)
6. Instruct and show students how to assist physician with sterile injection and/or aspiration of joint space. (* 4,5,6 & 12)
7. Explain and demonstrate how to assist physician in applying stress device on proper anatomical location and obtaining spot films and fluoroscopy. (* 3,4,5,6,7 & 8)
8. Review how to obtain conventional radiographs and develop. (* 2,3,4,5 & 6)
9. Instruct and show students how to provide patient with post-exam instructions and escort from room. (* 1,2 & 11)
10. Monitor students as they practice assisting with arthrogram examination. (* 7,8,9,10,11 & 12)
11. Supervise and evaluate students assisting with arthrogram examination. (* 13)

CRITERION-REFERENCED MEASURE:

The student must obtain scout films, prep injection site, assist physician with sterile injection, aspirate joint space, applying stress device and obtaining spot films, develop films, obtain radiographs and provide patient care. The radiograph must demonstrate the desired image and patient care must be provided.

PERFORMANCE GUIDE:

1. Verify physician's orders and prepare room.
2. Greet patient and instruct patient to remove necessary clothing/jewelry and don gown.
3. Escort patient onto table and explain procedure to patient. Obtain signed consent form. Ascertain that patient is not pregnant.
4. Obtain scout films as directed by department protocol.
5. Prep injection site.
6. Summon physician and introduce patient to physician.
7. Assist physician with sterile injection and/or aspiration of joint space.
8. Assist physician in applying stress device and obtaining spot films and fluoroscopy.
9. Develop spot films and present to physician.
10. Obtain conventional radiographs as directed by physician/department protocol.
11. Provide patient with post-exam instructions.
12. Escort from room.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Assist with arthrogram examination.

ENABLER

1. Review physician's orders.
2. Recall purpose of consent forms.

STUDENT'S NAME ____________________ **DATE** __________

EVALUATOR'S NAME ____________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to assist with arthrogram examination.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's orders and prepared room.		
2.	Greeted patient and instructed patient to remove necessary clothing/jewelry and don gown.		
3.	Escorted patient onto table, explained procedure to patient, obtained signed consent form and verified that patient is not pregnant.		
4.	Obtained scout films as directed by department protocol.		
5.	Prepped injection site.		
6.	Summoned physician and introduced patient to physician.		
7.	Assisted physician with sterile injection and/or aspiration of joint space.		
8.	Assisted physician in applying stress device and obtaining spot films and fluoroscopy.		
9.	Developed spot films and presented to physician.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Obtained conventional radiographs as directed by physician/department protocol.	______	______
11. Provided patient with post-exam instructions.	______	______
12. Escorted patient from room.	______	______

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 180

TASK: Assist with trans-hepatic cholangiogram examination.

STANDARD OF PERFORMANCE OF TASK:

Physician must be assisted with radiologic, pre-operative exploration of the biliary tract. Scout films and overhead radiographs must be taken as directed by physician.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Radiographic/fluorscopic room
Film/cassettes
Markers
Calipers
Technique chart
Contrast media
PTC needles
Consent form
Physician's orders
Mayo stand
(Sterile supplies on Mayo stand)
(2) 50cc syringes
(Draw up contrast in syringes)
General or local anesthetic (as directed by physician)

ENABLING OBJECTIVES:

1. Review physician's orders.
2. Recall purpose of a consent form.
3. Review established department procedure for trans-hepatic cholangiogram examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Moss, A., Rin, E., & Higgins, C. (1986). NMR, CT and interventional radiology. St. Louis, MO: C.V. Mosby Company.
5. Ring, E., & McLean, G. (1987). Interventional radiology: Principles and techniques. Boston, MA: Little, Brown and Company.
6. Wilkins, R., & Viamonte, M. (1982). Interventional radiology. Boston, MA: Blackwell Scientific Publications Ltd.
7. Radiographic/fluorographic room.
8. Radiographic film and cassettes.
9. Technique/procedure manual.
10. Physician's order/consent form.
11. Contrast media.
12. PTC needles.
13. Checklist - Assisting with trans-hepatic cholangiogram examination.

TEACHING ACTIVITIES:

1. Explain and demonstrate how to prepare examination room. (* 1 & 7)
2. Review and show students how to greet patient, verify patient identification, and assist patient onto radiographic table. (* 1,2 & 10)
3. Demonstrate how to explain examination procedure to patient and obtain signed consent forms. (* 2 & 10)
4. Explain and demonstrate how to obtain "scout" radiographs of area to be examined. (* 3,4,5 & 6)
5. Discuss and show students how to assist physician with sterile percutaneous puncture, injection of contrast media and fluoroscopy. (* 1,3,9,11 & 12)
6. Explain and demonstrate how to take overhead radiographs and develop film. (* 3,4,5 & 6)
7. Instruct students on how to give films to physician. (* 1)
8. Review and show students how to transport patient per stretcher after exam is completed. (* 1 & 3)
9. Monitor students as they practice assisting with trans-hepatic cholangiogram examination. (* 7,8,9,10 & 11)
10. Supervise and evaluate students assisting with trans-hepatic cholangiogram examination. (* 12)

CRITERION-REFERENCED MEASURE:

The student must take overhead radiographs, develop films, and provide for patient care. The radiographs must demonstrate the desired image and patient care must be provided.

PERFORMANCE GUIDE:

1. Prepare examination room.
2. Check physician's orders, greet patient, verify patient identification, and assist patient onto radiographic table.
3. Explain exam to patient and obtain signed consent form.
4. Make "scout" radiographs as directed by department protocol.
5. Summon physician and assist with sterile percutaneous puncture, injection of contrast media and fluoroscopy.
6. Take overhead radiographs as directed by physician.
7. Develop films.
8. Present films to physician.
9. Inform patient that exam is complete and make arrangements for patient to be transported per stretcher back to bed or to surgery, as directed by physician.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Assist with trans-hepatic cholangiogram examination.

ENABLER

1. Review physician's orders.
2. Recall purpose of a consent form.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**_________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to assist with trans-hepatic cholangiogram examination.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Prepared examination room.		
2.	Checked physician's orders, greeted patient, verified patient identification, and assisted patient onto radiographic table.		
3.	Explained exam to patient and obtained signed consent form.		
4.	Made "scout" radiographs as directed by department protocol.		
5.	Summoned physician and assisted with sterile percutaneous puncture, injection of contrast media and fluoroscopy.		
6.	Made overhead radiographs as directed by physician.		
7.	Developed films.		
8.	Presented films to physician.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Informed patient that exam was complete and made arrangements for patient to be transported per stretcher back to bed or to surgery, as directed by physician.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 181

TASK: Conduct scans using Gamma IV camera.

STANDARD OF PERFORMANCE OF TASK:

Scans must include all anatomy requested, using the prescribed technique, collimator, and program protocol.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Gamma IV camera
Collimator
Control system
Department procedure

ENABLING OBJECTIVES:

1. Review physician's orders.
2. Identify anatomical parts.
3. Review established department procedures for using Gamma IV cameras.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
5. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.
6. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
7. Gamma IV Camera.

***RESOURCES:** (cont.)

8. Collimator.
9. Recording device and media.
10. Checklist - Conducting scans using Gamma IV Camera.

TEACHING ACTIVITIES:

1. Explain and demonstrate how to install the collimator on the camera head. (* 6)
2. Instruct and demonstrate how to select the isotope to be used and peak the Gamma camera for that isotope. (* 2,3,4,6 & 7)
3. Instruct and show the students how to place a source of the isotope to be used and peak the Gamma camera for that isotope. (* 2,3 & 5)
4. Explain and demonstrate how to select the window width and mode of data acquisition. (* 2,3,5 & 6)
5. Instruct and show students how to depress stop and reset to ensure that the Gamma camera is at start. (* 6)
6. Demonstrate how to prepare recording media for data acquisition. (* 1,2 & 3)
7. Discuss and show how to position the patient under the camera head so that the anatomical part to be examined is in the center of the field of view. (* 1 & 6)
8. Instruct students to proceed with data acquisition upon dose administration per department procedure. (* 2,3,4 & 5)
9. Explain and show how to reset camera between images. (* 2,3 & 5)
10. Instruct and demonstrate how to record the images as required by the recording media and devices utilized. (* 1 & 9)
11. Instruct students to terminate the acquire mode and proceed to next study upon completion of data acquisition. (* 2,3 & 5)
12. Monitor students as they practice conducting scans using Gamma IV camera. (* 7,8 & 9)
13. Supervise and evaluate students conducting scans using Gamma IV camera. (* 10)

CRITERION-REFERENCED MEASURE:

The student must install the collimator, select the isotope and isotope range, peak the Gamma camera, select the time and counts, test the camera, position the patient, complete the images, and verify scan demonstrates the desired anatomical part(s).

PERFORMANCE GUIDE:

1. Verify physician's request and establish the procedure to be performed.
2. Install the collimator on the camera head per department procedure.
3. Select the isotope and isotope range that will be used on the control panel.
4. Place a source of the isotope to be used and peak the Gamma camera for that isotope.
5. Select the window width and mode of data acquisition.
    A. Time-select the length of acquisition time per image.
    B. Count-select the number of acquired counts per image.
6. Depress stop.
7. Reset the stop button to ensure that the Gamma camera is at start.
8. Prepare recording media for data acquisition.
9. Position the patient under the camera head so the anatomical part to be examined is in the center of the field of view.
10. Proceed with data acquisition upon dose administration, according to department procedure.
11. Reset camera between images and proceed until all images required have been completed.
12. Record the images as required by the recording media and device utilized.
13. Upon completion of data acquisition, terminate the acquire mode and proceed to the next study.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct scans using Gamma IV camera.

ENABLER

1. Review physician's orders.
2. Identify anatomical parts.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct scans using Gamma IV camera.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Verified physician's request and established the procedure to be performed.	______	______
2.	Installed the collimator on the camera head per department procedure.	______	______
3.	Selected the isotope and isotope range that was used on the control panel.	______	______
4.	Placed a source of the isotope to be used and peaked the Gamma camera for that isotope.	______	______
5.	Selected the window width and mode of data acquisition.	______	______
6.	Selected the length of acquisition time per image.	______	______
7.	Selected the number of acquired counts per image.	______	______
6.	Depressed stop.	______	______
7.	Reset the stop button to ensure that the Gamma camera was at start.	______	______
8.	Prepared recording media for data acquisition.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Positioned the patient under the camera head so the anatomical part to be examined yes in the center of the field of view.	________	________
10. Proceeded with data acquisition upon dose administration, according to department procedure.	________	________
11. Reset camera between images and proceeded until all images required had been completed.	________	________
12. Recorded the images as required by the recording media and device utilized.	________	________
13. Terminated the acquired mode upon completion of data acquisition and proceeded to the next study.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 182

TASK: Assist with hysterosalpingography examination (non-gravid patient).

STANDARD OF PERFORMANCE OF TASK:

Patient, supplies, and radiographic room must be prepared to assist physician with the radiographic examination of the non-gravid uterus and adnexa. Fluoroscopic and spot radiographs must demonstrate the anatomical part being examined without fogging or artifacts.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Film/cassettes
Mayo stand
Contrast media
Sterile gloves
Vaginal speculum
Chux
Uterine cannula
Sanitary pads
Gooseneck lamp
5cc syringe
Lubricant (sterile)
Tenaculum
Acorn adapter
Radiographic/fluoroscopic room
Betadine solution and cotton

ENABLING OBJECTIVES:

1. Verify physician's order/request for hysterosalpingography examination.
2. Recall the meaning of non-gravid uterus and adnexa.
3. Identify and assemble equipment and supplies needed to conduct a hysterosalpingography examination.
4. Prepare radiographic examination room for a hysterosalpingography examination.
5. Review established department policy/procedure for performing a hysterosalpingography.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
5. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
6. Ring, E., & McLean, G. (1987). Interventional radiology: Principles and techniques. Boston, MA: Little, Brown and Company.
7. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
8. Radiographic/fluoroscopic.
9. Radiographic examination supplies.
10. Chux.
11. Gooseneck lamp.
12. Checklist - Assisting with hysterosalpingography examination.

TEACHING ACTIVITIES:

1. Review and show students how to greet patient, explain procedure, obtain signed consent form, and instruct patient to remove clothes and don gown. (* 1 & 2)
2. Discuss reason for emptying patient's bladder and demonstrate how to instruct patient to empty bladder. (* 1,2 & 3)
3. Review and demonstrate procedure for performing scout films. (* 3,4 & 5)
4. Explain and demonstrate how to assist patient onto table and position patient in cystoscopic position. (* 1,3,4 & 10)
5. Demonstrate how to adjust lamp to illuminate area. (* 1,3,4,7 & 11)
6. Explain and show student's how to assist physician with instruments needed to inject contrast. (* 5,6,8 & 9)
7. Instruct and demonstrate students on how to ready fluoroscopic equipment and assist physician during fluorscopy. (* 5 & 6)
8. Review how to develop films. (* 3,4,5 & 7)

TEACHING ACTIVITIES: (cont.)

9. Explain and demonstrate how to assist patient from exam table. (* 1,3,4 & 7)
10. Discuss and demonstrate how to give patient sanitary pad and tell patient about follow up care and possible side effects. (* 1,2,3 & 9)
11. Monitor students as they practice assisting with hysterosalpingography examination. (* 8,9,10 & 11)
12. Evaluate and supervise students assisting with hysterosalpingography examination. (* 12)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, take scout film, position patient, summon physician, assist with contrast injection, take fluoroscopic and spot films, develop films and provide patient with post-exam information.

PERFORMANCE GUIDE:

1. Greet patient and give instructions for removing clothing and donning gown.
2. Instruct patient to empty bladder.
3. Escort patient into room, explain exam and obtain signed consent form.
4. Take a scout film.
5. Place the patient in cystoscopic position and adjust lamp to illuminate area. Place chux under patient.
6. Summon physician and introduce patient to physician.
7. Assist physician with the instrumentation required to inject contrast.
8. Assist physician with fluoroscopic and spot films.
9. Develop films.
10. Assist patient from exam table and provide patient with sanitary pad. Give patient post-exam information.
    NOTE: Some patients experience transitory abdominal cramping after the exam and may need to rest in a recumbent position for a short while before returning home.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Assist with hysterosalpingography examination (non-gravid patient).

ENABLER

1. Recall the meaning of non-gravid uterus and adnexa.
2. Identify and assemble equipment and supplies needed to conduct a hysterosalpingography examination.
3. Prepare radiographic examination room for a hysterosalpingography examination.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to assist with hysterosalpingography examination (non-gravid patient).

	PERFORMANCE DETERMINANTS	YES	NO
1.	Greeted patient and gave instructions for removing clothing and donning gown.		
2.	Instructed patient to empty bladder.		
3.	Escorted patient into room, explained exam and obtained signed consent form.		
4.	Took a scout film.		
5.	Placed the patient in cystoscopic position, adjusted lamp to illuminate area and placed chux under patient.		
6.	Summoned physician and introduced patient to physician.		
7.	Assisted physician with the instrumentation required to inject contrast.		
8.	Assisted physician with fluoroscopic and spot films.		

	PERFORMANCE DETERMINANTS (cont.)	**YES**	**NO**
9.	Developed films.	______	______
10.	Assisted patient from exam table, provided patient with sanitary pad and gave patient post-exam information.	______	______

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 183

TASK: Conduct localization radiographs.

STANDARD OF PERFORMANCE OF TASK:

Localization radiographs must be obtained with or without the assistance of a physician. Films must be made in at least two planes and careful attention must be used to provide maximum detail.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Markers
Technique book
Film/screen
Radiographic room/unit
Processing facilities

ENABLING OBJECTIVES:

1. Verify physician's request for localization radiograph.
2. Identify planes which are to be measured.
3. Review established department policy/procedure for conducting localization films.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Bontrager, K., & Anthony, B. (1987). Textbook of radiographic positioning and related anatomy. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
5. Bushong, S. (1984). Radiologic science for technologists: Physics, biology and protection (3rd ed.). St. Louis, MO: C.V. Mosby Company.117

***RESOURCES:** (cont.)

6. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
7. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
8. Radiographic/fluorographic unit.
9. Technique/procedure manual.
10. Film and film cassettes.
11. Checklist - Conducting localization radiographs.

TEACHING ACTIVITIES:

1. Discuss and demonstrate how to assemble equipment and prepare examination room. (* 1,2,4,8 & 10)
2. Review and show students how to greet patient, verify patient's identification and explain procedure to the patient. (* 1 & 7)
3. Conduct class discussion on positioning the patient and stress the importance of correct positioning. (* 1,2 & 3)
4. Explain and demonstrate how to take localization radiographs in at least two planes. (* 2,5,6,8,9 & 10)
5. Instruct students to adjust exposure factors to the tissue density of the area examined. (* 2,5,6,7 & 9)
6. Monitor students as they practice conducting localization radiographs. (* 8,9 & 10)
7. Supervise and evaluate students conducting localization radiographs. (* 11)

CRITERION-REFERENCED MEASURE:

The student must assemble equipment, prepare the examination room, greet patient, verify patient's identification, explain procedure, position patient, and take localization radiograph in at least two planes.

PERFORMANCE GUIDE:

1. Verify physician's orders.
2. Assemble equipment and prepare examination room:
   A. Choose a room that is known to have a focal spot that is free from cracking, pitting, or rippling. Use the smallest reasonable focal-spot size without compromising loss of detail due to motion during a lengthy exposure.

PERFORMANCE GUIDE: (cont.)

2. Assemble equipment and prepare examination room: (cont.)
   B. Screens and cassettes should be free of artifacts producing materials, scratches, and stains. Good screen/film contact should be ensured to avoid loss of detail.
3. Greet patient, verify patient's identification and explain procedure.
4. Position patient:
   A. Positioning of the patient is of the utmost importance, as even a slight rotation of the part to be examined may cause errors in depth measurements.
5. Take localization radiographs in at least two planes.
   NOTE: Exposure factors should be adjusted to the tissue density of the area examined. Involuntary motion must be compensated for by a short exposure time.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct localization radiographs.

ENABLER

1. Verify physician's request for localization radiograph.
2. Identify planes which are to be measured.

STUDENT'S NAME ____________________ **DATE** __________

EVALUATOR'S NAME ____________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct localization radiographs.

PERFORMANCE DETERMINANTS	YES	NO
1. Verified physician's orders.	______	______
2. Assembled equipment and prepared examination room:		
- Used the smallest reasonable focal-spot size without compromising loss of detail due to motion during a lengthy exposure.	______	______
- Screens and cassettes were free of artifact producing materials, scratches, and stains.	______	______
3. Greeted patient, verified patient's identification and explained procedure.	______	______
4. Positioned patient.	______	______
5. Took localization radiographs in at least two planes.	______	______

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 184

TASK: Assist with bronchogram examination.

STANDARD OF PERFORMANCE OF TASK:

Prepare supplies/equipment and assist physician in radiography of the lungs and bronchial tree by means of introducing an iodinated contrast media into the bronchi. Radiologic technologist must follow physician's orders without error.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Radiographic/fluoroscopic room
Film/screens
Radiographic processing facilities
Catheter
Markers
Signed consent form
Contrast media
Laryngeal cannula
Syringe(s)
Local anesthetic
Two technologists

ENABLING OBJECTIVES:

1. Verify physician's request/orders.
2. Identify and assemble tools and materials needed for bronchogram examination.
3. Recall procedures for using iodinated contrast media.
4. Review established department procedure for assisting with bronchogram examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

*RESOURCES: (cont.)

3. Bontrager, K., & Anthony, B. (1987). Textbook of radiographic positioning and related anatomy. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
5. Bushong, S. (1984). Radiologic science for technologists: Physics, biology and protection (3rd ed.). St. Louis, MO: C.V. Mosby Company.
6. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
7. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
8. Radiographic/fluorographic unit.
9. Technique/procedure manual.
10. Film and film cassettes.
11. Signed consent form.
12. Radiograph processing unit.
13. Iodinated contrast media.
14. Laryngeal cannula.
15. Checklist - Assisting with bronchograms.

TEACHING ACTIVITIES:

1. Conduct discussion on supplies/equipment needed for examination. (* 1,2,3 & 5)
2. Review and show students how to greet patient, explain procedure, obtain signed consent form, and ascertain that patient has received pre-medication. (* 1,4,7 & 11))
3. Explain and demonstrate how to position patient for scout films. (* 1,2 & 3)
4. Instruct and show how to develop films and present to physician. (* 2,3 & 13)
5. Discuss how to request patient's cooperation during examination. (* 1,2,3,4 & 11)
6. Explain and show how to assist the physician in positioning the patient as necessary to fill bronchial tree. (* 2,5 & 6)
7. Instruct and demonstrate how to obtain and process the post injection views requested by physician. (* 2,5,9 & 13)
8. Instruct students on how to have patient cough gently.
9. Explain and demonstrate how to reverse each of the filling positions for a few moments to accomplish postural drainage. (* 5,6 & 13)

TEACHING ACTIVITIES: (cont.)

10. Instruct students to take post-drainage films. (* 2,3,4,5,8 & 10)
11. Monitor students as the practice assisting with bronchogram examinations. (* 8,9,10,11,12,13 & 14)
12. Supervise and evaluate students assisting with bronchogram examination. (* 15)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, identify tools and equipment needed for bronchogram, assemble tools, set up examination room, position patient, take scout films, take spot films, assist physician with filling bronchial tree, reverse filling positions and take post-drainage films.

PERFORMANCE GUIDE:

1. Check physician's orders.
2. Set up room with supplies/equipment.
3. Greet patient and explain procedure, obtain signed consent form, and ascertain that patient has received pre-medication.
4. Position patient for scout films.
5. Develop films and present to physician.
6. Stress to patient the importance of his/her cooperation.
   NOTE: Assure patient that he/she will be able to breathe even though contrast media is being injected into the lungs. Patient must also be aware that he/she should restrain the urge to cough until asked to. Instruct patient to breathe rapidly and shallowly during procedure.
7. Assist the physician in positioning the patient as necessary for any of the several methods used to fill the bronchial tree.
8. Assist physician with obtaining spot films.
9. Obtain and process the post injection views requested by physician.
   NOTE: These films should be made as rapidly as possible.
10. Instruct patient to cough gently, to avoid forcing contrast into alveoli.
11. Reverse each of the filling positions for a few moments and accomplish postural drainage.

PERFORMANCE GUIDE: (cont.)

12. Take post-drainage films.
    NOTE: After physician sees post drainage films and the patient, the patient can be discharged or taken to the recovery room, if exam was performed under general anesthetic.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Assist with bronchogram examination.

ENABLER

1. Verify physician's request/orders.
2. Identify and assemble tools and materials needed for bronchogram examination.
3. Recall procedures for using iodinated contrast media.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to assist with bronchogram examination.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Checked physician's orders.	______	______
2.	Set up room with supplies/equipment.	______	______
3.	Greeted patient and explained procedure, obtained signed consent form, and verified that patient had received pre-medication.	______	______
4.	Positioned patient for scout films.	______	______
5.	Developed films and presented to physician.	______	______
6.	Stressed to patient the importance of their cooperation.	______	______
7.	Assisted the physician in positioning the patient as necessary for any of the several methods used to fill the bronchial tree.	______	______
8.	Assisted physician with obtaining spot films.	______	______

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
9.	Obtained and processed the post injection views requested by physician.		
10.	Instructed patient to cough gently, to avoid forcing contrast into alveoli.		
11.	Reversed each of the filling positions for a few moments and accomplished postural drainage.		
12.	Took post-drainage films.		

PERFORMANCE OBJECTIVE NO. 185

TASK: Perform intravenous pyelogram.

STANDARD OF PERFORMANCE OF TASK:

Perform diagnostic quality intravenous pyelogram, utilizing a minimum of radiation exposure to patient.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's requisition/chart
Caliper
Patient identification
Technique chart
Markers (right and left)
Gonadal shield
Immobilization device(s)
Lead aprons
Linear tomographic unit
Procedure manual
Consent form (if required)
Film cassettes
Intravenous infusion set
Tourniquet
Bandage/pressure dressing
Contrast media
Film identification apparaturs
Radiographic processing equipment
NOTE: Crash cart must be readily available in case of adverse contrast reaction.

ENABLING OBJECTIVES:

1. Verify physician's request/orders.
2. Recall purpose of intravenous pyelograms.
3. Identify and assemble tools and materials needed to perform intravenous pyelogram.
4. Review established department procedure for assisting with pyelograms examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Bontrager, K., & Anthony, B. (1987). Textbook of radiographic positioning and related anatomy. St. Louis, MO: C.V. Mosby Company.
5. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.
6. Bushong, S. (1984). Radiologic science for technologists: Physics, biology and protection (3rd ed.). St. Louis, MO: C.V. Mosby Company.
7. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
8. Intravenous infusion set.
9. Radiograph processing equipment.
10. Procedure/technique manual.
11. Radiation markers/shields.
12. Radiographic unit.
13. Contrast media.
14. Consent forms.
15. Checklist - Performing intravenous pyelograms.

TEACHING ACTIVITIES:

1. Review and show students how to greet patient, explain procedure to patient, obtain allergy history and signed patient consent form and instruct patient to remove any radio-opaque objects. (* 1,2,3,4 & 14))
2. Demonstrate how to assist patient onto x-ray table. (* 3 & 4)
3. Review how to obtain preliminary "scout film" radiographs and how to process and evaluate radiographs. (* 3,4,5,6,7 & 12)
4. Explain and demonstrate how to assist radiologist with injection of contrast media. (* 6,7,8,10 & 13)
5. Instruct students to observe patient for adverse reactions. (* 1,2 & 5)
6. Show how to make serial exposures as directed by radiologist. (* 3,6,7 & 12)
7. Explain and demonstrate how to take nephrotomograms. (* 6,7 & 10)

TEACHING ACTIVITIES: (cont.)

8. Review how to process radiographs and evaluate radiograpic images. (* 1,3,5 & 9)
9. Demonstrate how to assist patient off table and provide with post exam information. (* 1 & 2)
10. Monitor students as they practice performing intravenous pyelogram. (* 8,9,10,11,12,13 & 14)
11. Supervise and evaluate students performing intravenous pyelogram. (* 15)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, identify and prepare contrast media, prepare and position patient for examination, take scout films, evaluate films, assist physician with contrast injection, watch for adverse reaction, and make serial radiographs.

PERFORMANCE GUIDE:

1. Verify patient's identification and physician's orders.
2. Prepare contrast media.
3. Conduct patient into radiographic room:
    - A. Greet patient.
    - B. Explain procedure.
    - C. Instruct patient to remove any radio-opaque objects from area to be examined.
    - D. Obtain allergy history and have patient sign consent form as per department procedure.
    - E. Request patient to empty bladder.
4. Assist patient onto x-ray table.
5. Obtain preliminary "scout film" radiograph(s).
6. Process and evaluate radiograph(s).
7. Present film(s) to radiologist, obtaining additional views if/as requested.
8. Assist radiologist with injection of contrast medium.
   NOTE: Observe patient throughout remainder of exam for adverse reactions to contrast media.
9. Make serial exposures as directed by radiologist, following department procedures. Nephrotomograms may be included during serial radiographs, as deemed necessary.
10. Process radiographs.
11. Evaluate radiographic images to determine if:
    - A. Correct anatomical part was demonstrated.
    - B. Part, film, and central ray were aligned.
    - C. Correct exposure factors were used.
    - D. Film was identified (right and left of patient).

PERFORMANCE GUIDE (cont.)

11. Evaluate radiographic images to determine if: (cont.)
    E. Film demonstrated evidence of collimation.
    NOTE: If above conditions are not acceptable, take additional views as necessary.
12. Present films to radiologist. Obtain follow-up films as directed.
13. Assist patient off table and provide with post-exam information.
    NOTE: If patient has bladder catheter, clamp tubing prior to injection of contrast media and unclamp catheter when exam is done.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Perform intravenous pyelogram.

ENABLER

1. Verify physician's request/orders.
2. Recall purpose of intravenous pyelogram.
3. Identify and assemble tools and materials needed to perform intravenous pyelogram.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform intravenous pyelogram.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified patient's identification and physician's orders.		
2.	Prepared contrast media.		
3.	Conducted patient into radiographic room:		
	- Greeted patient.		
	- Explained procedure.		
	- Instructed patient to remove any radio-opaque objects from area to be examined.		
	- Obtained allergy history and had patient sign consent form as per department procedure.		
	- Requested patient to empty bladder.		
4.	Assisted patient onto x-ray table.		
5.	Obtained preliminary "scout film" radiograph(s).		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
6. Processed and evaluated radiograph(s).		
7. Presented film(s) to radiologist, obtaining additional views if/as requested.		
8. Assisted radiologist with injection of contrast medium.		
9. Made serial exposures as directed by radiologist, following department procedures.		
10. Processed radiographs.		
11. Evaluated radiographic images to determine if:		
- Demonstrated correct anatomical part.		
- Aligned part, film, and central ray.		
- Used correct exposure factors.		
- Identified film (right and left of patient).		
- Demonstrated evidence of film collimation.		
12. Presented films to radiologist and obtained follow-up films as directed.		
13. Assisted patient off table and provided post-exam information.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 186

TASK: Conduct voiding cystogram examination.

STANDARD OF PERFORMANCE OF TASK:

Perform diagnostic quality voiding cystograms, using a minimum of radiation to the patient. Radiographic images must include preliminary "scout films" radiographs, voiding radiographs and post-voiding radiographs.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's requisition/chart
Patient's identification
Caliper
Technique chart
Film cassettes
Film identification apparatus
Markers (right and left)
Gonadal shield
Immobilization device(s)
Lead aprons
Radiographic processing equipment
Procedure manual
Rad/fluoro unit
Catheter tray
Consent form, if required
Contrast
Absorbent pad
Tubing and female adaptor

ENABLING OBJECTIVES:

1. Recall the purpose of a voiding cystogram.
2. Identify tools and materials needed to conduct voiding cystogram.
3. Identify type of contrast media to be used for voiding cystogram examination.
4. Review established department policy/procedure for conducting voiding cystogram examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Bontrager, K., & Anthony, B. (1987). Textbook of radiographic positioning and related anatomy. St. Louis, MO: C.V. Mosby Company.
5. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
6. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
7. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
8. Rad/fluoro unit.
9. Technique/procedure manual.
10. Catheter tray.
11. Radiation measuring devices and shields.
12. Checklist - Conducting voiding cystogram examination.

TEACHING ACTIVITIES:

1. Review and show students how to greet patient, explain procedure, obtain allergy history and signed patient consent form, and instruct patient to remove any radio-opaque objects. (* 1,2 & 5)
2. Review and demonstrate how to assist patient onto x-ray table. (* 3 & 4)
3. Instruct students how to obtain and develop preliminary "scout film" radiographs. (* 3,5,6 & 7)
4. Discuss supplies needed for catheterization. (* 1,3,9 & 10)
5. Explain and demonstrate how to set up fluoroscopic equipment. (* 3,6,7,8 & 11)
6. Discuss and show how to assist radiologist with catheterizing patient, administrating contrast media and performing fluoroscopy and spot filming. (* 1,3,5,6,7,8 & 9)
7. Explain and demonstrate how to remove urinary catheter. (* 1,3,9 & 10)
8. Instruct students on how to make radiographs with patient voiding. (* 3,5,6 & 7)

TEACHING ACTIVITIES: (cont.)

9. Show students how to assist patient off x-ray table and assist patient to bathroom. (* 1,3 & 4)
10. Instruct and show students how to disinfect table. (* 1,3 & 5)
11. Demonstrate to students how to make post-voiding radiographs and present films to radiologist. (* 6 & 7)
12. Explain and demonstrate how to give post exam instruction/information to patient. (* 1 & 2)
13. Monitor students as they practice conducting voiding cystogram examination. (* 8,9,10,11 & 12)
14. Supervise and evaluate students conducting voiding cystogram examination. (* 8)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain the procedure, verify consent form, take preliminary "scout film" radiographs, review scout films, set up fluoroscopic equipment, assist in catheterazation of patient, assist with administration of contrast media, take voiding radiographs, assist patient in cleaning up, and provide patient with post exam information.

PERFORMANCE GUIDE:

1. Verify patient's identification and physician's orders.
2. Conduct patient into radiographic room:
   - A. Greet patient.
   - B. Explain procedure.
   - C. Instruct patient to remove any radio-opaque objects from area to be examined.
   - D. Obtain allergy history and signed consent form per department procedure.
3. Assist patient onto x-ray table.
4. Obtain preliminary "scout film" radiographs.
5. Present films to radiologist, obtaining additional views if requested.
6. Assemble supplies for catheterization.
7. Set up fluoroscopic equipment.
8. Assist radiologist with catheterization of patient.
9. Assist radiologist with administration of contrast media.
10. Assist radiologist with fluoroscopy and spot filming.
11. Make radiographs as requested by radiologist.
12. Remove urinary catheter.
    CAUTION: If Foley catheter, withdraw water from balloon before removing.

PERFORMANCE GUIDE: (cont.)

13. Make radiographs with patient voiding:
    - A. Place an absorbent pad under patient.
    - B. Request patient to void on table.
14. Assist patient off x-ray table.
15. Allow patient to go to the bathroom to clean up.
16. Disinfect table.
17. Make post-voiding radiograph(s).
18. Process radiographs.
19. Present films to radiologist, obtaining additional views if requested.
20. Provide patient with post exam information.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct voiding cystogram examination.

ENABLER

1. Recall the purpose of a voiding cystogram.
2. Identify tools and materials needed to conduct voiding cystogram.
3. Identify type of contrast media to be used for voiding cystogram examination.

STUDENT'S NAME____________________________**DATE**__________

EVALUATOR'S NAME__________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct voiding cystogram examination.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified patient's identification and physician's orders.		
2.	Conducted patient into radiographic room.		
3.	Greeted patient.		
4.	Explained procedure.		
5.	Instructed patient to remove any radio-opaque objects from area to be examined.		
6.	Obtained allergy history and patient signature on consent form per department procedure.		
7.	Assisted patient onto x-ray table.		
8.	Obtained preliminary "scout film" radiographs.		
9.	Presented films to radiologist, obtaining additional views if requested.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
10.	Assembled supplies for catheterization.	________	________
11.	Set up fluoroscopic equipment.	________	________
12.	Assisted radiologist with catheterization of patient.	________	________
13.	Assisted radiologist with administration of contrast media.	________	________
14.	Assisted radiologist with fluoroscopy and spot filming.	________	________
15.	Made radiographs as requested by radiologist.	________	________
16.	Removed urinary catheter.	________	________
17.	Made radiographs with patient voiding.	________	________
18.	Placed an absorbent pad under patient.	________	________
19.	Requested patient to void on table.	________	________
20.	Assisted patient off x-ray table.	________	________
21.	Allowed patient to go to the bathroom to clean up.	________	________
22.	Disinfected table.	________	________
23.	Made post-voiding radiograph(s).	________	________
24.	Processed radiographs.	________	________
25.	Presented films to radiologist, obtaining additional views if requested.	________	________
26.	Provided patient with postexam information.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 187

TASK: Conduct intravenous cholangiogram examination.

STANDARD OF PERFORMANCE OF TASK:

Perform diagnostic quality intravenous cholangiogram, utilizing a minimum of radiation exposure to patient. Radiographic images must include preliminary "scout film" radiograph(s), serial exposure radiographs and follow-up radiographs. Radiographic images must demonstrate the correct anatomical part.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Radiographer Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's requisition/chart
Patient's identification
Caliper
Technique chart
Film cassettes
Film identification apparatus
Markers (right and left)
Gonadal shield
Immobilization device(s)
Lead aprons
Radiographic processing equipment
Procedure manual
Linear tomographic unit
Consent form (if required)
Contrast media
Tourniquet
Intravenous infusion set
Bandage/pressure dressing

ENABLING OBJECTIVES:

1. Review physician's request/orders.
2. Recall purpose of intravenous cholangiogram examination.

ENABLING OBJECTIVES: (cont.)

3. Identify and assemble tools and materials needed to conduct an intravenous cholangiogram examination.
4. Review established department policy/procedure for conducting an intravenous cholangiogram examination.

*RESOURCES:

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D. (1986). A radiographer's handbook of hospital practice. Boston, MA: Blackwell Scientific Publications Ltd.
5. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
6. Ring, E., & McLean, G. (1987). Interventional radiology: Principles and techniques. Boston, MA: Little, Brown and Company.
7. Wilkins, R., & Viamonte, M. (1982). Interventional radiology. Boston, MA: Blackwell Scientific Publications Ltd.
8. Technical procedure manual.
9. Radiographic unit.
10. Radiographic processing unit.
11. Intravenous infusion set.
12. Tomographic unit.
13. Contrast media.
14. Checklist - Conducting intravenous cholangiogram examination.

TEACHING ACTIVITIES:

1. Review and show students how to prepare contrast media. (* 1,2,3 & 8)
2. Explain and demonstrate how to greet patient, explain procedure, instruct patient to remove any radio-opaque objects, obtain allergy history and obtain signed consent form per department procedure. (* 1,2 & 4)

TEACHING ACTIVITIES: (cont.)

3. Discuss and demonstrate how to assist and position patient on x-ray table. (* 1 & 3)
4. Instruct and show students how to take preliminary "scout film" radiograph(s), process and evaluate the radiograph(s). (* 3,5,8 & 9)
5. Demonstrate how to review films with radiologist. (* 1 & 3)
6. Explain and demonstrate how to assist radiologist with injection of contrast media. (* 6,7,8,11, & 13)
7. Discuss possible adverse contrast reactions and instruct students on how to observe patient throughout exam for signs of adverse reactions. (* 1,3 & 4)
8. Demonstrate how to make serial exposures and tomograms following department procedures. (* 3,6,7,9 & 12)
9. Discuss and show how to process and evaluate radiographs. (* 1,3 & 4)
10. Instruct and demonstrate how to assist patient off table and give postexam instructions/information. (* 1,2 & 3)
11. Monitor students as they practice conducting intravenous cholangiogram examination. (* 14)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and signed consent form, explain procedure, position patient, take scout film(s), review scout film(s) with radiologist, assist with injection of contrast media, take serial exposures and tomograms, process radiographs, and provide patient with postexam information.

PERFORMANCE GUIDE:

1. Verify patient's identification and physician's orders.
2. Prepare contrast media.
3. Conduct patient into radiographic room:
   - A. Greet patient.
   - B. Explain procedure.
   - C. Instruct patient to remove any radio-opaque objects from area to be examined.
   - D. Obtain allergy history and instruct patient to sign consent form per department procedure.
4. Assist patient onto x-ray table.
5. Obtain preliminary "scout film" radiograph(s).
6. Process and evaluate radiograph(s).

PERFORMANCE GUIDE: (cont.)

7. Present film(s) to radiologist, obtaining additional views if/as requested.
8. Assist radiologist with injection of contrast medium.
   NOTE: Observe patient throughout remainder of exam for adverse contrast reactions.
9. Make serial exposures as directed by radiologist, following department procedures. Tomogram(s) may be included during serial radiographs, as deemed necessary.
10. Process radiographs.
11. Evaluate radiographic images to determine if:
    - A. Correct anatomical part was demonstrated.
    - B. Part, film, and central ray were aligned.
    - C. Correct exposure factors were used.
    - D. Film was identified (right and left of patient).
    - E. Film demonstrated evidence of collimation.
      NOTE: If above conditions are not acceptable, take additional views as necessary.
12. Present films to radiologist. Obtain follow-up films as directed.
13. Assist patient off table and provide with postexam information.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct intravenous cholangiogram examination.

ENABLER

1. Review physician's request/orders.
2. Recall purpose of intravenous cholangiogram examination.
3. Identify and assemble tools and materials needed to conduct a intravenous cholangiogram examination.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct intravenous cholangiogram examination.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Verified patient's identification and physician's orders.	______	______
2.	Prepared contrast media.	______	______
3.	Conducted patient into radiographic room.	______	______
4.	Greeted patient.	______	______
5.	Explained procedure.	______	______
6.	Instructed patient to remove any radio-opaque objects from area to be examined.	______	______
7.	Obtained allergy history and instructed patient to sign consent form per department procedure.	______	______
8.	Assisted patient onto x-ray table.	______	______
9.	Obtained preliminary "scout film" radiographs.	______	______
10.	Processed and evaluated radiograph(s).	______	______

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
11.	Presented film(s) to radiologist, obtaining additional views if/as requested.		
12.	Assisted radiologist with injection of contrast medium.		
13.	Made serial exposures as directed by radiologist, following department procedures. Tomogram(s) may be included during serial radiographs, as deemed necessary.		
14.	Processed radiographs.		
15.	Evaluated radiographic images to determine if correct anatomical part was demonstrated.		
16.	Evaluated radiographic images to determine if part, film, and central ray were aligned.		
17.	Evaluated radiographic images to determine if correct exposure factors were used.		
18.	Evaluated radiographic images to determine if film was identified (right and left of patient).		
19.	Evaluated radiographic images to determine if film demonstrated evidence of collimation.		
20.	Presented films to radiologist and obtained follow-up films as directed.		
21.	Assisted patient off table and provided with postexam information.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 188

TASK: Perform echocardiogram examination.

STANDARD OF PERFORMANCE OF TASK:

Strip-chart recordings of the movement of the various chambers of the heart and its valves must be produced using M-mode echocardiography. Echocardiography examination results will include measurement of chamber size, assessment of valve functioning, pericardial effusion, and neoplasms. Real time (two dimensional) echocardiography must provide an anatomical representation of the heart with its chambers and valves. Hard copy records of examination results must be produced.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Diagnostic Ultrasound For Radiographers.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's request
Patient's chart
Coupling media
Examination table
Ancillary recording device
Recording media
Ultrasound examination device (M-mode and real-time)

ENABLING OBJECTIVES:

1. Verify physician's request/orders.
2. Identify and assemble equipment and supplies needed to perform echocardiogram examination.
3. Recall difference between M-mode and real-time scanning.
4. Identify method for making hard copy record of examination results.
5. Review established department policy/procedure for performing echocardiogram examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Chang, S. (1982). Echocardiography: Techniques and interpretion (2nd ed.). Philadephia, PA: Lea and Febiger.
3. Kleid, J. (1978). Echocardiogrqphy: Interpretation and diagnosis. East Norwalk, CT: Appleton.
4. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
5. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
6. Williams, R., Bierman, F., & Sanders, S. (1986). Echocardiographic diagnosis of cardiac malformations. Boston, MA: Little, Brown and Company.
7. Mintz, G. (1986). Diagnostic cardiac ultrasound. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
8. Sutton, M., & Oldershaw, P. (1987). Textbook of echocardiography. Boston, MA: Blackwell Scientific Publications.
9. Ultrasound examination device.
10. Ancillary recording device.
11. Coupling media.
12. Recording media.
13. Patient's chart/physician's request.
14. Checklist - Performing echocardiogram examination.

TEACHING ACTIVITIES:

1. Conduct class discussion on types of echocardiography scans. (* 2,3,6,7 & 8)
2. Explain and demonstrate how to determine type of echocardiography scan to be performed. (* 1,5 & 14)
3. Instruct and demonstrate students how to select type of transducer needed. (* 1,2,3,6 & 7)
4. Review and show students how to greet patient, verify patient's identification and explain procedure to patient. (* 1 & 9)
5. Review and demonstrate how to assist patient onto examination table and position patient. (* 1 & 9)
6. Explain how to conduct echocardiography scan. (* 2,3,6,7 & 8)
7. Demonstrate how to conduct real-time scan. (* 2,3,6,7,8,10 & 12)

TEACHING ACTIVITIES: (cont.)

8. Demonstrate how to conduct a M-mode scan. (* 2,3,6,7,8,10 & 12)
9. Instruct and demonstrate to students how to verify echocardiography examination results and create a hard copy for pertinent data. (* 2,3,6,8 & 13)
10. Identify hospital's guidelines for labeling hard copy record. (* 1,5 & 13)
11. Demonstrate how to label hard copy record. (* 13)
12. Discuss and demonstrate how to record examination on patient's chart. (* 1 & 14)
13. Monitor students as they practice performing echocardiogram examination. (* 10,11,12,13 & 14)
14. Supervise and evaluate students performing echocardiogram examination. (* 15)

CRITERION-REFERENCED MEASURE:

The student must verify the physician's request/orders, identify type of echocardiogram exam to be performed, verify patient's identification and explain procedure, position patient, apply coupling media to examination area, position transducer, conduct scan, verify examination results, make hard copy record of examination results and label hard copy record.

PERFORMANCE GUIDE:

1. Verify physician's request.
2. Determine type of echocardiography scan to be performed:
    A. M-mode scanning.
    B. Real-time scanning.
3. Identify type of transducer needed:
    A. M-mode transducer:
        1. Hand held.
    B. Real time:
        1. Mechanical.
        2. Linear array.
        3. Phased array.
4. Greet patient, explain examination procedures, and answer patient's questions.
5. Assist patient on the examination table and position patient for examination.

PERFORMANCE GUIDE: (cont.)

6. Conduct echocardiography scan:
   A. M-mode scan:
      1. Select hand-held transducer, ranging in frequency from 2.25 to 5 MHz, depending on patient size.
      2. Set ultrasound examination instrument to M-mode display and turn on strip-chart recorder.
      3. Place coupling media on examination area and transducer face.
      4. Position transducer in coupling media on examination area, angled toward the area of interest.
         NOTE: Ensure that coupling media eliminates all air between transducer and tissue interface.
      5. Conduct scan observing strip-chart recorder results.
   B. Real-time scan:
      1. Establish examination routine.
      2. Select type of real-time display:
         a. Sector.
         b. Linear array.
      3. Turn on real-time scanning system.
      4. Apply coupling media to examination area and position the transducer, eliminating all air from between the transducer and tissue interface.
         NOTE: A real-time transducer, positioned and moved linearly, will create a rectangular image, while a real-time transducer positioned and moved at an angle will produce a sector or pie-shaped image.
      5. Conduct scan, while observing the TV monitor for the resulting real-time images.
      6. Record hard copy of real-time image on videotape.
7. Verify echocardiography examination results hard copy for pertinent data.
   NOTE: Always verify hard copy record before turning off the machine or going to the next scan.
8. Label hard copy record and store according to hospital's established guidelines.
9. Record examination on patient's chart.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Perform echocardiogram examination.

ENABLER

1. Verify physician's request/orders.
2. Identify and assemble equipment and supplies needed to perform echocardiogram examination.
3. Recall difference between M-mode and real-time scanning.
4. Identify method for making hard copy record of examination results.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform echocardiogram examination.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's request.		
2.	Determined type of echocardiography scan to be performed.		
3.	Identified type of transducer needed.		
4.	Greeted patient, explained examination procedures, and answered patient's questions.		
5.	Assisted patient on the examination table and positioned patient for examination.		
6.	Conducted echocardiography scan.		
7.	Selected hand-held transducer, ranging in frequency from 2.25 to 5 MHz, depending on patient size.		
8.	Set ultrasound examining instrument to M-mode display and turned on strip-chart recorder.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
9.	Placed coupling media on examination area and transducer face.	________	________
10.	Positioned transducer in coupling media on examination area, angled toward the area of interest.	________	________
11.	Conducted scan observing strip-chart recorder results.	________	________
12.	Turned on real-time scanning system.	________	________
13.	Applied coupling media to examination area and positioned the transducer, eliminating all air from between the transducer and tissue interface.	________	________
14.	Conducted scan, while observing the TV monitor for the resulting real-time images.	________	________
15.	Recorded hard copy of real-time image on videotape.	________	________
16.	Verified echocardiography examination results hard copy for pertinent data.	________	________
17.	Labeled hard copy record and stored according to hospital's established guidelines.	________	________
18.	Recorded examination on patient's chart.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 189

TASK: Conduct ultrasound abdominal examination.

STANDARD OF PERFORMANCE OF TASK:

The ultrasound abdominal scans must be made in at least two planes, usually at right angles to each other and must include one or more of the following organs; liver, spleen, gallbladder, pancreas, kidney or aorta. Hard copy record of examination results must be produced.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Diagnostic Ultrasound For Radiographers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Physician's request
Ultrasound examining device
Ancilliary recording device
Examination table
Coupling media

ENABLING OBJECTIVES:

1. Verify physician's order/request for ultrasound abdominal examination.
2. Recall ultrasound tools and equipment needed to scan requested organ.
3. Assemble needed ultrasound tools and equipment.
4. Identify method for recording ultrasound examination results.
5. Review established department policy/procedure for conducting abdominal ultrasound examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

3. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Lees, W. (1987). Abdominal ultrasonography. Boston, MA: Blackwell Scientific Publications Ltd.
5. Athey, P., & McClendon, L. (1984). Diagnostic Ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
6. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.
7. Metrewell, C. (1979). Practical abdominal ultrasound. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
8. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
9. Ultrasound examining device.
10. Ancilliary recording device and recording media.
11. Coupling media.
12. Checklist - Conducting ultrasound abdominal examination.

TEACHING ACTIVITIES:

1. Review and demonstrate how to greet patient, explain examination procedures and answer patient questions. (* 1,2 & 12)
2. Review and demonstrate how to assist patient on examination table, position patient and apply coupling media to examination area. (* 2 & 3)
3. Discuss how to identify organ to be examined. (* 1,2 & 5)
4. Explain and demonstrate how to scan liver. (* 3,4,5,6,7,8 & 9)
5. Explain and demonstrate how to scan spleen. (* 3,4,5,6,7 & 8)
6. Instruct and demonstrate how to scan gallbladder. (* 3,4,5,6,7,8 & 9)
7. Explain and demonstrate how to scan kidneys for prone kidney view, recumbent lateral position and supine kidney view. (* 3,4,5,6,7,8 & 9)
8. Explain and demonstrate how to scan pancreas. (* 3,4,5,6,7,8 & 9)
9. Explain and demonstrate how to scan aorta. (* 3,4,5,6,7,8 & 9)
10. Review and demonstrate how to record examination results on hard copy record. (* 1,2,3,8 & 10)
11. Instruct students to label and store record according to department policy (* 1,2,3 & 8)

TEACHING ACTIVITIES: (cont.)

12. Discuss and demonstrate how to record scan procedure on patient's chart. (* 6,7 & 8)
13. Monitor students as they practice conducting ultrasonic abdominal examination. (* 9,10,11 & 12)
14. Supervise and evaluate students conducting ultrasound abdominal examination. (* 13)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, position patient, apply coupling media on area to be examined, scan area, record scan on hard copy, label hard copy and record results on file.

PERFORMANCE GUIDE:

1. Obtain physician's request and verify scan ordered.
2. Assemble needed ultrasound equipment.
3. Greet patient, explain examination procedures, and answer patient's questions.
4. Assist patient on examination table, position patient for examination and apply coupling media to examination area.
5. Identify organs to be examined and scan examination area:
   A. Liver:
      1. Select a 2.25 to 3.5 MHz transducer with sufficient penetration to visualize the diaphragm.
      2. Place the patient in a supine position, position the transducer in the coupling media on the examination area and instruct patient to suppress a deep inspiration.
      3. Scan liver transversely from diaphragm to the lowest margin of the right lobe at 1-2 cm increments.
      4. Scan the liver longitudinally from the most lateral margin of the left lobe to the right lateral abdominal wall at 1-2 cm increments.
      5. Instruct patient to suspend respiration on deep inspiration and sector or single pass scan between the ribs.
         NOTE: A 5.0 MHz transducer can be used on transverse scans of smaller patients or to provide better delineation of lesions in the near field.

PERFORMANCE GUIDE: (cont.)

6. Adjust gain and TGC control to provide uniform echogenicity throughout a normal liver.
   NOTE: A fat-infiltrated or cirrhotic liver will need a lower transducer frequency or a steeper TGC slope than normal.

B. Spleen:
   1. Determine types of scans to be made:
      a. Transverse and coronal scans:
         1. Place patient in right lateral position.
      b. Transverse and longitudinal scans.
         1. Place patient in prone position.
   2. Select a small diameter (13 mm) transducer with a 3.5 - 5.0 MHz frequency and position transducer in coupling media on examination area between ribs.
   3. Instruct patient to suspend respiration in deep inspiration.
   4. Sector scan both scan planes in increments of 1 cm.
   5. Adjust gain and TGC controls to provide uniform echogenicity and sufficient penetration.
      NOTE: The spleen is relatively anechoic and easy to penetrate since it is full of blood.

C. Gallbladder:
   1. Select the highest frequency transducer with a small-diameter consistent with adequate penetration.
      NOTE: Small stones within the gallbladder and their acoustic shadows are more readily visualized with a small-diameter, high frequency transducer.
   2. Position patient in supine position, position transducer in coupling media on examination area, and instruct patient to suspend a deep inspiration.
      NOTE: Suspended deep inspiration is helpful to pull the gallbladder below the costal margin for easier scanning.
   3. Conduct sector or single pass scan at 0.5 cm increments in transverse and longitudinal planes.
   4. Record scan results on hard copy record.

PERFORMANCE GUIDE: (cont.)

5. Position patient in the left posterior oblique position, position transducer in coupling media on examination area, and instruct patient to suspend a deep inspiration.
6. Conduct sector or single pass scan at 0.5 cm increments in a plane parallel to the long axis of the organ.
7. Record scan results on hard copy record.
   NOTE: Since mobility of echogenic foci within the gallbladder is one of the criteria for gallstones, it is sometimes necessary to perform scans with the patient in additional positions to demonstrate motion of the gallstones.
8. Position patient in erect or right posterior oblique positions, position transducer in coupling media on examination area, and instruct patient to suspend a deep inspiration.
9. Conduct sector or single pass scan in additional positions to demonstrate motion of gallstones.
10. Record scan results on hard copy record.
11. Compare hard copy scan results of the different positions.

D. Pancreas:

1. Select a 3.5 - 5.0 MHz transducer with a 3 to 7 cm focus.
   NOTE: A slightly longer focus, 7 to 11 cm, will be required for obese patients.
2. Place patient in a supine position, position transducer in coupling media, and instruct patient to suspend a deep inspiration.
   NOTE: Suspended deep inspiration can help provide a larger liver area as a scanning window.
3. Conduct transverse scan, utilizing a slightly rotated transverse plane with a 3 to 5 degree caudad angulation, paralleling the long axis of the organ at 0.5 cm increments.
   NOTE: This procedure makes maximum use of the left lobe of the liver as an acoustic window.
4. Record scan results on hard copy record.
5. Conduct longitudinal scans parallel to the inferior vena cava at 0.5 cm increments.

PERFORMANCE GUIDE: (cont.)

6. Record scan results on hard copy record.
   NOTE: The tail of the pancreas may be difficult to visualize on supine scan due to overlying bowel gas.
7. Instruct patient to drink 1-2 glasses of water.
   NOTE: The fluid-filled stomach acts as an acoustic window to the pancreas.
8. Place patient in a prone position, position transducer in coupling media on examination area.
9. Conduct prone longitudinal scan of the left kidney.
   NOTE: Sometimes the tail of the pancreas can be visualized anterior to the left kidney on prone longitudinal scans of that organ.
10. Conduct transverse upright films.
    NOTE: (Sit the back of the cart up to support the patient.)
    NOTE: Sometimes the pancreas is seen better with the patient breathing quietly therefore, tell them to stop breathing when the best view is obtained. Try with a deep breath also. It's different with every patient.
11. Record scan results on hard copy record.

E. Kidney:
   1. Select a 3.5 MHz transducer.
   2. Conduct kidney scan:
      a. Prone kidney view:
         1. Place patient in prone position, and position transducer in coupling media on examination area.
         2. Conduct several transverse scans to establish the long axis and center of the kidney.
         3. Conduct longitudinal scans along the established axis in 0.5 to 1 cm increments.
         4. Rotate scanning arm 90 degrees from this plane and conduct transverse scans in 0.5 to 1 cm increments.
            NOTE: The long axes of the right and left kidneys are not parallel and need to be established independently.

PERFORMANCE GUIDE: (cont.)

b. Recumbent lateral position:
  1. Place patient in recumbent lateral position, position transducer in coupling media on examination area, and instruct patient to suspend a deep inspiration.
  2. Conduct real-time scan to establish the long axis of the kidney.
  3. Conduct scan of rotated coronal plane along the established long axis of the left kidney.
  4. Adjust TGC setting lower and conduct scan of the rotated coronal plane along the long axis of the right kidney.

     NOTE: The TGC setting will be lower for the right kidney because the right lobe of the liver provides an excellent acoustic window in this position.

     NOTE: The coronal section is often preferred over prone views, because there is less musculature to penetrate and offers certain advantages in diagnosis of hydronephrosis.

c. Supine kidney view:
  1. Place patient in supine position.
  2. Instruct patient to take a deep breath.
  3. Conduct longitudinal and transverse scans.

  NOTE: Right kidney can be viewed using the liver as a window.

F. Aorta:
  1. Select the highest frequency transducer consistent with adequate penetration and sufficient gain to detect the presence of a clot or clots within an aneurysm.
  2. Place the patient in a supine position and position transducer in coupling media on examination area.

PERFORMANCE GUIDE: (cont.)

3. Conduct transverse scans of the aorta at 1 cm increments, using a sector scanning motion.
4. Record scan results on hard copy record.
5. Conduct longitudinal scan, using simple scanning motion.
   NOTE: Unless the aorta is extremely tortuous, the entire aorta can be demonstrated on a single longitudinal scan.

6. Record examination results on a hard copy record.
7. Label and store record for future use.
8. Record scan procedure on patient's chart.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct ultrasound abdominal examination.

ENABLER

1. Verify physician's order/request for ultrasound abdominal examination.
2. Recall ultrasound tools and equipment needed to scan requested organ.
3. Assemble needed ultrasound tools and equipment.
4. Identify method for recording ultrasound examination results.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct ultrasound abdominal examination.

PERFORMANCE DETERMINANTS	YES	NO
1. Obtained physician's request and verified scan ordered.		
2. Assembled needed ultrasound equipment.		
3. Greeted patient, explained examination procedures, and answered patient questions.		
4. Assisted patient on examination table, positioned patient for examination and applied coupling media to examination area.		
5. Identified organs to be examined and scanned examination area: liver, spleen, gallbladder, pancreas, kidney, aorta.		
6. Recorded examination results on a hard copy record.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
7. Labeled and stored record for future use.	________	________
8. Recorded scan procedure on patient's chart.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 190

TASK: Conduct pelvic ultrasound examination.

STANDARD OF PERFORMANCE OF TASK:

Pelvic ultrasound examination must include the pelvic organs and adnexa. Results must be recorded on hard copy record.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Diagnostic Ultrasound For Radiographers.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's request
Patient's chart
Coupling media
Examination table
Recording media
Ancillary recording device

ENABLING OBJECTIVES:

1. Review physician's request/orders for pelvic ultrasound exam.
2. Identify and assemble tools and equipment needed for pelvic ultrasound exam.
3. Identify type of hard copy record to be made.
4. Review established department policy/procedure for conducting pelvic ultrasound examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Lees, W. (1987). Abdominal ultrasonography. Boston, MA: Blackwell Scientific Publications Ltd.

*RESOURCES: (cont.)

5. Athey, P., & McClendon, L. (1984). Diagnostic Ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
6. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.
7. Metrewell, C. (1979). Practical abdominal ultrasound. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
8. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
9. Ultrasound examination device.
10. Ancilliary recording device and recording media.
11. Coupling media.
12. Patient's chart.
13. Checklist - Conducting ultrasound abdominal examination.

TEACHING ACTIVITIES:

1. Discuss and assemble ultrasound equipment needed for pelvic ultrasound examination. (* 1,3,5,6,7 & 8)
2. Review and show students how to greet patient, explain procedure and answer patient's questions. (* 1,2 & 12)
3. Review and demonstrate how to assist patient onto examination table and place in supine position. (* 1 & 2)
4. Instruct and show how to apply coupling media to examination area. (* 4,5,6,7,8 & 9)
5. Discuss and demonstrate how to conduct ultrasound exam. (* 4,5,6,9 & 10)
6. Explain and show how to record scan results on hard copy. (* 4,5,6,7,8 & 10)
7. Demonstrate how to label hard copy and store. (* 1,2 & 9)
8. Review and show how to record procedure on patient's chart. (* 1,2 & 12)
9. Monitor students as they practice conducting ultrasound pelvic examination.
10. Evaluate students conducting ultrasonic pelvic exam. (* 13)

CRITERION-REFERENCED MEASURE:

The student must verify the physician's request, verify patient's identification and explain procedure, position patient, apply coupling media to examination area, verify that bladder is fully distended, conduct ultrasound scan, record examination results on hard copy, label hard copy results with patient information and record test procedure on patient's chart.

PERFORMANCE GUIDE:

1. Check physician's request and verify ultrasound scan to be performed.
2. Assemble needed ultrasound equipment.
3. Greet patient, explain procedure, and answer patient's questions concerning scanning procedures.
4. Assist patient onto table and place in a supine position.
5. Apply coupling media to examination area.
6. Conduct ultrasound exam:
    - A. Select a 3.5 MHz linear array transducer.
    - B. Place transducer in coupling media on examination area.
    - C. Determine by ultrasound that bladder is moderately to fully distended.

      NOTE: Patient shall have been previously prepared by one of the following methods:
        1. Have patient drink 32 oz of water 1 1/2 hours prior to examination.
        2. Increase drip speed of IV and do not allow patient to empty bladder prior to examination.
        3. Fill bladder in a retrograde manner through a catheter.
    - D. Conduct longitudinal and transverse scans of pelvic and adnexal area.

      NOTE: For adequate demonstration of the ovaries, longitudinal and transverse scans angled toward the side of interest are sometimes required.

      NOTE: For adequate demonstration of the prostate, additional transverse scans with 10 - 20 degree caudal angulation may be required or a transrectal probe may be used.

PERFORMANCE GUIDE: (cont.)

7. Record scan results on hard copy record prior to starting next scan.
8. Label hard copy record and store for future use.
9. Record procedure on patient's chart.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct pelvic ultrasound examination.

ENABLER

1. Review physician's request/orders for pelvic ultrasound exam.
2. Identify and assemble tools and equipment needed for pelvic ultrasound exam.
3. Identify type of hard copy record to be made.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct pelvic ultrasound examination.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Checked physician's request and verified ultrasound scan to be performed.		
2.	Assembled needed ultrasound equipment.		
3.	Greeted patient, explained procedure, and answered patient's questions concerning scanning procedures.		
4.	Assisted patient onto table and placed in a supine position.		
5.	Applied coupling media to examination area.		
6.	Conducted ultrasound exam.		
7.	Recorded scan results on hard copy record prior to starting next scan.		
8.	Labelled hard copy record and stored for future use.		
9.	Recorded procedure on patient's chart.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 191

TASK: Conduct doppler studies circulatory system examination.

STANDARD OF PERFORMANCE OF TASK:

Cardic blood flow shall be interrogated by pulsed doppler ultrasound. Multiple scan planes shall be recorded proximal to each valve within the orfice of each valve, and distal to each valve; within the great arteries and on either side up the interventricular and interatrial septa. Precise spectoral recording must be performed to correctly indicate the timing of flow relative to the ECG trace; direction of flow above or below the zero baseline; peak frequency of the doppler shift; and volume of the blood flow. Examination results must be recorded on a hard copy and audio visual.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Diagnostic Ultrasound For Radiographers.
Task in Radiographic Therapy and
Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's orders
Patient's chart
Coupling media
Audio visual recording device
Hard copy imaging camera
Recording media
45 degree angle block
Examination table
Real time ultrasound unit with doppler

ENABLING OBJECTIVES:

1. Verify physician's order/request for doppler study.
2. Identify and assemble equipment, tools and materials needed for doppler study.
3. Recall anatomy studied in a circulatory system examination.

ENABLING OBJECTIVES: (cont.)

4. Review established department policy/procedure for performing a doppler study of the circulatory system.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). *Primary health care handbook: Guideline for patient education*. Boston, MA: Little, Brown and Company.
3. Ballinger, P., (1986). *Merrill's atlas of radiographic positions and radiologic procedures*. St. Louis, MO: C.V. Mosby Company.
4. Hagen-Ansert, S. (1983). *Textbook of diagnostic ultrasonography* (2nd ed.). St. Louis, MO: C.V. Mosby Company.
5. Mintz, G. (1986). *Diagnostic cardiac ultrasound*. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Wicks, J., & Howe, K. (1983). *Fundamentals of ultrasonographic techniques*. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Real-time ultrasound unit with doppler.
8. Audio visual recording device and recording media.
9. Coupling media.
10. Patient's chart.
11. Checklist - Conducting doppler studies of circulatory system.

TEACHING ACTIVITIES:

1. Discuss and demonstrate how to adapt instrument to velocity mode. (* 5,6,7 & 8)
2. Review and show how to greet patient, verify patient's identification, explain procedure and answer patient's question. (* 1 & 2)
3. Review and demonstrate how to assist patient onto examination table. (* 1 & 3)
4. Explain and demonstrate how to attach ECG leads to patient. (* 5 & 8)
5. Expain and demonstrate how to position patient in LPO position. Instruct students to place 45 degree angle block under right shoulder to aid in stabilization. (* 1 & 3)
6. Instruct and show how to apply coupling media to cardiac area of chest. (* 1,3 & 4)

TEACHING ACTIVITIES: (cont.)

7. Discuss and demonstrate how to visualize the anatomic structures of interest from the appropriate scan plane. (* 1,3 & 4)
8. Instruct and demonstrate how to place the sample volume in the area of interest. (* 5 & 6)
9. Explain and demonstrate how to activate spectral display. (* 5 & 8)
10. Explain and show students how to obtain a continuous audio visual recording, moving sample volume about to determine area of highest velocity. (* 5 & 9)
11. Instruct and demonstrate how to obtain hard copy of each area of interest to document flow velocity. (* 5 & 9)
12. Discuss how to achieve multiple views. (* 4,5,6 & 7)
13. Show students how to repeat procedure through multiple views. (* 5 & 8)
14. Demonstrate how to record and verify hard copy record. (* 5,8 & 9)
15. Review and show students how to label, record and store hard copy according to established guidelines. (* 5,6,7 & 9)
16. Discuss and demonstrate how to record procedure on patient's chart. (* 1 & 11)
17. Monitor students as they practice conducting doppler studies of the circulatory system. (* 8,9,10 & 11)
18. Supervise and evaluate students conducting doppler studies circulatory system examination. (* 12)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, position patient, apply coupling media, conduct doppler study, make hard copy record, label and store hard copy record and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Verify physician's request.
2. Adapt instrument to velocity mode.
3. Greet patient, verify patient's identification, explain procedure and answer patient's questions.
4. Assist patient on examination table.
5. Attach ECG leads to patient.
6. Position patient in LPO position; place 45 angle block under right shoulder to aid in stabilization.
7. Apply coupling media to cardiac area of chest.

PERFORMANCE GUIDE: (cont.)

8. Begin doppler study by visualizing the anatomic structures of interest from the appropriate scan plane.
9. Place the sample volume in the area of interest.
10. Activate spectral display.
11. Obtain continuous audio visual recording moving sample volume about, to determine areas of highest velocity.
12. Obtain hard copy of each area of interest to document flow velocity (spectral and real time).
13. Repeat above procedure through multiple views:
    - A. Parasteral long axis.
    - B. Parasteral short axis.
    - C. Apical 4-chamber view.
    - D. Apical 4-chamber view with aorta (5-chamber view).
    - E. Apical long axis view.
    - F. Subcostal 4 chamber view.
    - G. Suprasternal long axis view.
14. Record and verify hard copy record before concluding exam.
15. Label, record, and store hard copy according to established guidelines.
16. Dismiss patient and record procedure on patient's chart.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct doppler studies circulatory system examination.

ENABLER

1. Verify physician's order/request for doppler study.
2. Identify and assemble equipment, tools and materials needed for doppler study.
3. Recall anatomy studied in a circulatory system examination.

STUDENT'S NAME ____________________ DATE __________

EVALUATOR'S NAME ____________________ COURSE __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct a doppler study of the circulatory.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's request.		
2.	Adapted instrument to velocity mode.		
3.	Greeted patient, verified patient's identification, explained procedure and answered patient's questions.		
4.	Assisted patient on examination table.		
5.	Attached ECG leads to patient.		
6.	Positioned patient in LPO position; placed 45 angle block under right shoulder to aid in stabilization.		
7.	Applied coupling media to cardiac area of chest.		
8.	Began doppler study by visualizing the anatomic structures of interest from the appropriate scan plane.		
9.	Activated the spectral display.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Obtained continuous audio visual recording, moving sample volume about to determine areas of highest velocity.	________	________
11. Obtained hard copy of each area of interest to document flow velocity (spectral and real time).	________	________
12. Repeated above procedure through multiple views.	________	________
13. Recorded and verified hard copy record before concluding exam.	________	________
14. Labeled, recorded, and stored hard copy according to established guidelines.	________	________
15. Dismissed patient and recorded procedure on patient's chart.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 192

TASK: Conduct ultrasound small parts examination.

STANDARD OF PERFORMANCE OF TASK:

Scans of the thyroid, parathyroid, scrotum, and breast must be made in at least two planes at right angles of the entire organ. Scan results must be recorded on a hard copy record.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Diagnostic Ultrasound For Radiographers.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's request
Patient's chart
Ultrasound scanning system
Coupling media
Examination table
Ancillary recording device
Recording media
Positioning device(s)

ENABLING OBJECTIVES:

1. Verify physician's request/orders.
2. Recall anatomy included in small parts examination.
3. Identify and assemble equipment and tools needed to conduct ultrasound small parts examination.
4. Review established department policy/procedure for conducting small parts ultrasound examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

4. Athey, P., & McClendon, L. (1984). Diagnostic Ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
5. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.
6. Sanders, R. (1984). Clinical Sonography: a practicle guide. Boston, MA: Little, Brown and Company.
7. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
8. Ultrasound scanning system.
9. Ancillary recording device and recording media.
10. Coupling media.
11. Patient's chart.
12. Checklist - Conducting small parts ultrasound examination.

TEACHING ACTIVITIES:

1. Review and show students how to greet patient, explain scan procedure and answer patient's questions. (* 1,2 & 3)
2. Instruct students on how to select a 7.5 or 10 MHz real-time, linear array probe. (* 3,4,5,6 & 7)
3. Explain and demonstrate how to place patient in supine position, using positioning devices if necessary. (* 1 & 3)
4. Instruct and show students how to apply coupling media to examination site and position the transducer in the coupling media. (* 3,4,5,6,7 & 10)
5. Discuss and demonstrate how to conduct scans at right angles covering the entire organ. (* 5,6 & 7)
6. Review and demonstrate how to record scan results on hard copy record and label record accurately. (* 1,3,4,8 & 9)
7. Discuss and show how to record scan procedure on patient's chart. (* 1,3 & 11)
8. Monitor students as they practice conducting ultrasound small parts examination. (* 8,9,10 & 11)
9. Supervise and evaluate students conducting ultrasound small parts examination. (* 12)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, position patient, apply coupling media, conduct scans in at least two planes, record scan results, and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Check physician's request and verify scan to be performed.
2. Greet patient, explain scan procedure, and answer patient's questions.
3. Select a 7.5 or 10 MHz real-time, linear array probe.
4. Place patient in a supine position. Positioning device(s) may be needed to ensure that area of interest remains motionless.
   NOTE: Small cysts can be missed if the patient moves.
5. Apply coupling media to the examination site and position the transducer in the coupling media.
6. Conduct scans in at least two planes at right angles using an extremely light touch and covering the entire organ.
   NOTE: Structures of interest are very superficial and can be distorted by pressure from the transducer.
7. Record scan results on hard copy record.
8. Record scan procedure on patient's chart.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct ultrasound small parts examination.

ENABLER

1. Verify physician's request/orders.
2. Recall anatomy included in small parts examination.
3. Identify and assemble equipment and tools needed to conduct ultrasound small parts examination.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**_________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct ultrasound small parts examination.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Checked physician's request and verified scan to be performed.	______	______
2.	Greeted patient, explained scan procedure, and answered patient's questions.	______	______
3.	Selected a 7.5 or 10 MHz real-time, linear array probe.	______	______
4.	Placed patient in a supine position.	______	______
5.	Applied coupling media to the examination site and positioned the transducer in the coupling media.	______	______
6.	Conducted scans in at least two planes at right angles using an extremely light touch and covering the entire organ.	______	______
7.	Recorded scan results on hard copy record.	______	______
8.	Recorded scan procedure on patient's chart.	______	______

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 193

TASK: Conduct ultrasound extremity examination.

STANDARD OF PERFORMANCE OF TASK:

The ultrasound extremity scan must determine the presence of neoplasm, abscess, hematoma, or other indications of superficial masses located within the extremity. Scan results must be recorded on a hard copy record.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Diagnostic Ultrasound For Radiographers.

CONDITIONS FOR PERFORMANCE OF TASK:

Patient's chart
Coupling media
Recording device
Recording media
Physician's orders
Ultrasound scan system

ENABLING OBJECTIVES:

1. Verify physician's request/orders.
2. Recall structures/masses which are scanned for during an ultrasound extremity examination.
3. Identify and assemble equipment and materials needed for ultrasound extremity examination.
4. Review established department policy/procedure for conducting ultrasound extremity examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

*RESOURCES: (cont.)

4. Athey, P., & McClendon, L. (1984). Diagnostic Ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
5. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.
6. Sanders, R. (1984). Clinical Sonography: a practicle guide. Boston, MA: Little, Brown and Company.
7. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
8. Ultrasound scanning system.
9. Ancillary recording device and recording media.
10. Coupling media.
11. Patient's chart.
12. Checklist - Conducting extremity ultrasound examination.

TEACHING ACTIVITIES:

1. Review and show how to greet patient, verify patient's identification and explain scan procedure. (* 1,2 & 11)
2. Explain and demonstrate how to assist patient onto examination table and position so the extremity area to be scanned is accessible. (* 1 & 3)
3. Explain and demonstrate how to apply coupling media. (* 3,4,7 & 10)
4. Conduct class discussion on types of structures/masses scanned for during ultrasound extremity examination. (* 1,3,6 & 7)
5. Discuss and show students how to perform sector scans in at least two planes over entire area. (* 3,4,5,6,7 & 8)
6. Review and demonstrate how to record scan results on a hard copy record. (* 3,4,5,6,7 & 9)
7. Explain and show how to label and store hard copy record according to department policy. (* 1)
8. Instruct and show students how to record procedure on patient's chart. (* 1,3 & 11)
9. Monitor students as they practice conducting ultrasound extremity examination. (* 8,9,10 & 11)
10. Supervise and evaluate students conducting ultrasound extremity examination. (* 12)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, position patient, apply coupling media, scan area of anatomy in at least two planes, record scan results on hard copy, label and store hard copy record, and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Verify physician's order.
2. Greet patient, verify identification and explain scan procedure.
3. Assist patient onto examination table and position patient so the extremity area to be scanned is accessible.
4. Apply coupling media.
5. Select 5.0 or 7.5 MHz small parts transducer.
6. Perform sector scans in at least two planes over entire area.
7. Record scan results on a hard copy record.
8. Label and store hard copy record.
9. Record procedure on patient's chart.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct ultrasound extremity examination.

ENABLER

1. Verify physician's request/orders.
2. Recall structures/masses which are scanned for during an ultrasound extremity examination.
3. Identify and assemble equipment and materials needed for ultrasound extremity examination.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct ultrasound extremity examination.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Verified physician's order.		
2.	Greeted patient, verified identification and explained scan procedure.		
3.	Assisted patient onto examination table and positioned patient so the extremity area to be scanned was accessible.		
4.	Applied coupling media.		
5.	Selected 5.0 or 7.5 MHz small parts transducer.		
6.	Performed sector scans in at least two planes over entire area.		
7.	Recorded scan results on a hard copy record.		
8.	Labeled and stored hard copy record.		
9.	Recorded procedure on patient's chart.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 194

TASK: Conduct ultrasound breast examination.

STANDARD OF PERFORMANCE OF TASK:

The ultrasound breast scan must determine whether a clinically palpable mass is cystic or solid. Examination results must be recorded on a hard copy record.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Diagnostic Ultrasound For Radiographers.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's order
Patient's chart
Ultrasound scan system
Coupling media
Recording device
Recording media

ENABLING OBJECTIVES:

1. Verify physician's orders/request.
2. Identify and assemble equipment and materials for ultrasound breast examination.
3. Review established department policy/procedure for conducting a ultrasound breast examination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Athey, P., & Hadlock, F. (1985). Ultrasound in obstetrics and gynecology (2nd ed.). St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

5. Sarti, D. (1982). Atlas of obstetric and gynecologic ultrasound. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Sarti, D. (1986). Diagnostic ultrasound: Text and cases. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Ultrasound scanning system.
8. Recording device and recording media.
9. Coupling media.
10. Patient's chart.
11. Checklist - Conducting ultrasound breast examination.

TEACHING ACTIVITIES:

1. Review and demonstrate how to greet patient, verify identification and explain procedure. (* 1,2 & 10)
2. Instruct and show students how to assist patient onto examination table and position patient in supine position. (* 1 & 3)
3. Instruct and demonstrate how to bare patient's breast and apply coupling media. (* 3,4,5,6 & 9)
4. Explain and show students how to set ultrasound scan TGC and select a small parts transducer. (* 3,4,5,6 & 7)
5. Discuss the importance of the patient remaining motionless. (* 1,3,4 & 5)
6. Explain and demonstrate how to conduct sector and single pass scans in at least two planes of the entire organ. (* 3,4,5,6 & 7)
7. Discuss and demonstrate procedure for recording scan results. (* 3,4,5 & 8)
8. Instruct and show how to label and store hard copy record. (* 1,2 & 10)
9. Review department procedures regarding recording scan information on patient's chart. (* 7,8,9 & 10)
10. Monitor students as they practice conducting ultrasound breast examination. (* 7,8,9 & 10)
11. Supervise and evaluate students conducting ultrasound breast examination. (* 11)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, position patient, apply coupling media to breast, set ultrasound system, conduct sector and single pass scans of entire organ, record scan results, label and store hard copy and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Verify physician's request.
2. Greet patient, verify identification and explain procedure.
3. Assist patient onto examination table and position patient in a supine position.
4. Bare patient's breast and apply coupling media.
5. Set ultrasound scan TGC select a small parts transducer.
6. Instruct patient to remain motionless.
   NOTE: It is important that the patient remains as motionless as possible because small cysts in the breast can be missed if the patient moves.
7. Conduct sector and single pass scans in at least two planes of the entire organ.
   NOTE: It is important that a light touch be used when scanning the breast, because the breast is very superficial structure and can be distorted by pressure from the transducer.
8. Record scan results on a hard copy record.
9. Label and store hard copy record for future reference.
10. Record scan information on patient's chart.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures.

TASK Conduct ultrasound breast examination.

ENABLER

1. Identify and assemble equipment and materials for ultrasound breast examination.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct ultrasound breast examination.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's request.		
2.	Greeted patient, verified identification and explained procedure.		
3.	Assisted patient onto examination table and positioned patient in a supine position.		
4.	Bared patient's breast and applied coupling media.		
5.	Set ultrasound scan system to mode and selected a transducer.		
6.	Instructed patient to remain motionless.		
7.	Conducted sector and single pass scans in at least two planes of the entire organ.		
8.	Recorded scan results on a hard copy record.		
9.	Labeled and stored hard copy record for future reference.		
10.	Recorded scan information on patient's chart.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 195

TASK: Conduct ultrasound needle localization.

STANDARD OF PERFORMANCE OF TASK:

Ultrasound localization must determine appropriate puncture location, depth, and angulation of needle necessary for a successful puncture.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Diagnostic Ultrasound For Radiographers.
Task in Radiation Therapy and Diagnostic Ultrasound- Research Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's order
Patient's chart
Ultrasound scan system
Coupling media
Recording device
Recording media
Localization needle
Sterile needle holder (attaches to the probe)

ENABLING OBJECTIVES:

1. Verify physician's order/request for needle localization.
2. Recall specialized equipment needed for ultrasound needle localization.
3. Identify and assemble equipment and materials needed to conduct ultrasound needle localization.
4. Review established department policy/procedures for conducting ultrasound needle localization.
5. Recall procedure for creating and maintaining sterile conditions.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

3. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Athey, P., & Hadlock, F. (1985). Ultrasound in obstetrics and gynecology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
5. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.
6. Sarti, D. (1982). Atlas of obstetric and gynecologic ultrasound. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
8. Ultrasound scanning system.
9. Recording device and recording media.
10. Localization needle and needle holder.
11. Patient's chart.
12. Coupling media.
13. Checklist - Conducting ultrasound needle localization.

TEACHING ACTIVITIES:

1. Explain and show how to greet patient, verify patient's identification, explain procedure to patient and obtain a signed consent form. (* 1,2 & 11)
2. Review and demonstrate how to assist patient on examination table and position for examination. (* 1 & 3)
3. Explain and show how to apply coupling media to examination area under sterile conditions. (* 4,5,6,7 & 12)
4. Conduct class discussion on the various procedures using ultrasound needle localization. (* 1,3,4,5,6 & 7)
5. Explain and demonstrate how to perform ultrasonic needle localization scan. (* 4,5,6,7,8 & 10)
6. Instruct and show how to record, label and store hard copy record of scan and localization. (* 5,6,7 & 9)
7. Review and demonstrate how to record scan procedure on patient's chart. (* 1,2 & 11)
8. Monitor students as they practice conducting ultrasound needle localization. (* 8,9,10,11 & 12)

TEACHING ACTIVITIES: (cont.)

9. Supervise and evaluate students conducting ultrasound needle localization.
(* 13)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure,and obtain a signed consent form, position patient, and identify area to be localized under sterile conditions. The student must apply coupling media to examination area, perform ultrasonic localization scan, insert needle, record scan/localization procedure, label and store hard copy record, and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Verify physician's order.
2. Greet patient, verify identification, explain procedure and obtain a signed consent form.
3. Assist patient onto examination table.
4. Determine purpose of ultrasonic localization:
    A. Localize kidneys for biopsy of the renal parenchyma.
    B. Localize renal cysts for puncture.
    C. Localize neoplastic masses for biopsy to obtain histology.
    D. Localize abscesses or other fluid collections for diagnosis and drainage.
    E. Localize the hydronephrotic calyces for nephrostomy tube placement.
    F. Directing amniocentesis (sampling amnotic fluid during pregnancy).
5. Position patient and apply coupling media to examination area.
6. Perform ultrasonic localization scan:
    A. Select settings for real-time scan on ultrasound scanning system.
    B. Localize the mass ultrasonically.
    C. Mark skin in appropriate puncture location.
    D. Note depth and angulation of the needle necessary for successful puncture.
    E. Establish a sterile field.
    F. Stabilize the needle with a specially constructed biopsy transducer.
    G. Monitor continuously the needle's progress on the scan screen.

PERFORMANCE GUIDE: (cont.)

7. Record hard copy record of scan and localization.
8. Label and store hard copy record.
9. Record scan procedure on patient's chart.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct ultrasound needle localization.

ENABLER

1. Verify physician's order/request for needle localization.
2. Recall specialized equipment needed for ultrasound needle localization.
3. Identify and assemble equipment and materials needed to conduct ultrasound needle localization.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct ultrasound needle localization.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's order.	______	______
2.	Greeted patient, verified identification and explained procedure.	______	______
3.	Obtained a signed consent form.	______	______
4.	Assisted patient onto examination table.	______	______
5.	Determined purpose of ultrasonic localization.	______	______
6.	Positioned patient and applied coupling media to examination area.	______	______
7.	Selected settings for real-time scan on ultrasound scanning system.	______	______
8.	Localized the mass ultrasonically.	______	______
9.	Marked skin in appropriate puncture location.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Noted depth and angulation of the needle necessary for successful puncture.		
11. Created sterile field at localization site.		
12. Stabilized the needle with a specially constructed biopsy transducer.		
13. Monitored continuously the needle's progress on the scan screen.		
14. Recorded hard copy record of scan and localization.		
15. Labeled and stored hard copy record.		
16. Recorded scan procedure on patient's chart.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 196

TASK: Conduct obstetric ultrasound examination.

STANDARD OF PERFORMANCE OF TASK:

Obstetric ultrasound examination must include pregnancy detection, fetal age (gestational age), fetal structures, and pregnancy abnormalities. Results must be recorded on hard copy record.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's request
Patient's chart
Ancillary recording device
Coupling media
Examination table
Recording media

ENABLING OBJECTIVES:

1. Establish stage of pregnancy.
2. Identify ultrasound equipment needed for examination.
3. Identify female and fetal anatomy.
4. Review established department protocol for conducting ultrasound scans.

***RESOURCES:**

1. Department policy/procedure manual.
2. Athey, P. and Hadlock, F. (1985). Ultrasound in obstetrics and gynecology (2nd. ed.). St. Louis, Mo: C.V. Mosby Company.
3. Athey, P. and McClendon, L. (1984.) Diagnostic ultrasound for radiographers. St. Louis, Mo: C.V. Mosby Company.
4. Sanders, R. and Everette, J. (1980). The principles and practices of ultrasound in obstetrics and gynecology. East Norwalk, CT: Appleton-Century-Crofts.

***RESOURCES:** (cont.)

5. Wicks, J. and Howe, I. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers - Time Mirror Books.
6. Bowerman, R. (1986). Atlas of normal fetal ultrasonographic anatomy. Chicago, IL: Year Book Medical Publishers - Time Mirror Books.
7. Bennett, M. and Cambell, S. (1980). Real-time ultrasound in obstetrics. Boston, MA: Blackwell Scientific Publications.
8. American College of Radiology. (1985). Obstetric/ultrasound guidelines. Chicago, IL: Author.
9. Ultrasound scanning model/phantom.
10. Ultrasound scanning equipment.
11. Obstetric ultrasound scan simulation cases.
12. Hard copy records of obstetric ultrasound scans.
13. First trimester pregnancy structures.
14. Second and third trimester ultrasound scan planes.
15. Checklist - Conducting ultrasound obstetric examination.

TEACHING ACTIVITIES:

1. Present lecture on types of ultrasound equipment available for obstetric ultrasound examination. (* 2,3,4,5,6 & 7)
2. Discuss operational modes utilized in ultrasound examination. (* 2,3,4 & 8)
3. Question students concerning the difference between A-mode, B-Mode, M-Mode, real-time and doppler ultrasound. (* 2,3,4,5 & 7)
4. Discuss the importance of the transducer shape and size for obtaining the desired scan results. (* 2,5 & 12)
5. Conduct a class discussion on types of coupling media, their use and importance. (* 3 & 5)
6. Demonstrate to students how and where coupling media is applied. (* 3,5 & 8)
7. Monitor students while they practice applying coupling media. (* 8)
8. Present lecture on type of obstetric examination performed by ultrasound. (* 2,4,6 & 7)
9. Discuss crown-rump length and fetal pole check conducted in first trimester of pregnancy. (* 2,4,11 & 13)
10. Discuss second and third trimester ultrasound scans. (* 2,4,11 & 14)
11. Demonstrate obstetric ultrasound examination procedure. (* 2,4,9 & 11)

TEACHING ACTIVITIES (cont.)

12. Monitor students while they practice conducting obstetric ultrasound examination.
13. Discuss the importance of hard copy records of the ultrasound scan. (* 11)
14. Conduct a class discussion on situations that might require a hardcopy record of an ultrasound/scan. (* 2,4,6,7,10 & 11)
15. Conduct class discussion on different methods of making hard copy records of scan results. (* 1,2,3,4,5,6 & 7)
16. Demonstrate procedure for making a hard copy record of the ultrasound scan result. (* 2,3,4,5,6,7,8,9 & 11)
17. Assign student to conduct an obstetric ultrasound examination. (* 15)

CRITERION-REFERENCED MEASURE:

The student must assemble/prepare the equipment, determine the obstetric ultrasound examination needed, apply the coupling media, conduct the obstetric ultrasound scan and make a hard copy record of the scan results in accordance with department protocol.

PERFORMANCE GUIDE:

1. Check physician's request and verify ultrasound exam to be performed.
2. Assemble needed ultrasound equipment.
3. Greet patient, explain procedure, and answer patient's questions concerning scanning procedure.
4. Assist patient onto table and place in supine position.
5. Apply coupling media to abdomen.
6. Conduct ultrasound scan:
    A. Select 3.5 mHz transducer.
    B. Determine by ultrasound that patient's bladder is moderately to fully distended.
    C. The following structures shall be demonstrated, according to estimated fetal age by LMP:
        1. First trimester:
            a. Crown-rump length or gestational sac measurement.
            b. Presence or absence of fetal life.
            c. Fetal number.
            d. Evaluation of uterus, cervix and adnexal structures.
            e. Check fetal pole.

PERFORMANCE GUIDE: (cont.)

2. Second and third trimester:
    a. Saggital scans:
        1. Midline-lower uterine segment:
            a. Intrauterine pregnancy.
            b. Masses in LUS/Cx/adnexa.
            c. Cervical incompetence.
            d. Position of placenta and grading.
            e. Fetal life, number and presentation.
            f. BPD of head (biparietal diameter).
            g. Femur length measurement.
            h. Amount of amniotic fluid.
            i. Check heart and BPM (beats per minute) of fetus.
            j. Fetal anatomy:
                - Cerebral ventricles.
                - Spine.
                - Stomach.
                - Urinary bladder.
                - Umbilical cord insertion.
                - Renal region.
        2. Midline-mid portion of uterus.
        3. Midline-fundal portion of uterus.
        4. View to right of midline.
        5. View to left of midline.

7. Obtain hard copy record.
8. Release patient and assemble ultrasound examination results for physician's interpretation.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct obstetric ultrasound examination.

ENABLER

1. Identify female and fetal anatomy.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when conducting an obstetric ultrasound examination.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified ultrasound examination to be performed.		
2.	Assembled needed ultrasound equipment prior to beginning the examination.		
3.	Greeted patient and answered patient's questions.		
4.	Assisted patient on to examination table.		
5.	Positioned patient for scan.		
6.	Assured patient's privacy.		
7.	Applied coupling media to patient's abdomen.		
8.	Selected appropriate size and shaped transducer.		
9.	Determined if patient's bladder was full.		
10.	Demonstrated appropriate structures on scan.		
11.	Created hard copy record of scan results.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
12. Labeled hard copy record of scan results.	______	______
13. Dismissed patient after hard copy was recorded and labeled.	______	______
14. Assembled scan results for physician.	______	______

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 197

TASK: Operate ultrasound equipment.

STANDARD OF PERFORMANCE OF TASK:

The operator must be familiar with the instrumentation, functions, and settings for the total ultrasound system, including the transmitter, receiver, display modes, display screens, hard copy recorders, and coupling media. The operator must conduct test scans and measurements, using a test object or phantom as a "patient". Scan result measurements and parameters must match those established for that test object or phantom.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Diagnostic Ultrasound For Radiographers.

CONDITIONS FOR PERFORMANCE OF TASK:

Operator
Ultrasound system
Ultrasound system manuals
Test object or phantom

ENABLING OBJECTIVES:

1. Recall types of ultrasound systems.
2. Identify and assemble ultrasound equipment.
3. Review established department policy/procedure for operation of ultrasound equipment.

***RESOURCES:**

1. Department policy/procedure manual.
2. Athey, P., & Hadlock, F. (1985). Ultrasound in obstetrics and gynecology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
3. Athey, P., & McClendon, L. (1984). Diagnostic ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.
4. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

5. Sarti, D. (1986). Diagnostic ultrasound: Text and cases. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Ultrasound equipment.
8. Test object of phantom.
9. Ultrasound equipment operator's manual.
10. Checklist - Operation ultrasound equipment.

TEACHING ACTIVITIES:

1. Instruct students how to obtain and review ultrasound system manuals. (* 1 & 9)
2. Discuss how to identify transmitter components and settings. (* 2,3,4,5 &)
3. Show students transmitter components and settings. (* 7)
4. Discuss how to identify receiver components and settings. (* 2,3,4,5 & 6)
5. Show students receiver components and settings. (* 7)
6. Discuss how to identify display modes and settings. (* 2,3,4,5 & 6)
7. Show students display modes and settings. (* 7)
8. Discuss how to identify display systems and settings. (* 2,3,4,5 & 6)
9. Show students display systems and settings. (* 7)
10. Discuss how to identify hard copy recording devices and settings. (* 2,3,4,5 & 6)
11. Show students hard copy recording devices and settings. (* 7)
12. Conduct class discussion on how to select coupling media. (* 2,3 & 6)
13. Identify types of coupling medias. (* 2,3,4,5 & 6)
14. Explain and demonstrate how to perform test scans and measurements using the test object of phantom. (* 2,3,4,5,6,7 & 8)
15. Instruct and show students how to record scan results on hard copy record and compare to established measurements and parameters for the test object phantom. (* 1,2,3 & 8)
16. Monitor students as they practice operating ultrasound equipment. (* 7,8 & 19)
17. Supervise and evaluate students operating ultrasound equipment. (* 10)

CRITERION-REFERENCED MEASURE:

The student must locate ultrasound equipment to be operated, identify transmitter components and settings, receiver components and settings, display mode and setting, display system and settings, hard copy recording device and settings, select coupling media, test scan phantom or test object, record scan results on quality assurance record.

PERFORMANCE GUIDE:

1. Obtain and review ultrasound system manuals.
2. Identify transmitter components and settings:
   A. Transducer.
   B. Pulse generator.
   C. Pulse repeater.
   D. Attenuator.
3. Identify receiver components and settings:
   A. Transducer.
   B. R F amplifier.
   C. Time gain compensation (TGC) or slope control.
   D. Demodulator.
   E. Video Amplifier.
   NOTE: The transducer is common to both the transmitter and receiver, since it both sends the ultrasound pulse and receives the returning echo.
4. Identify display modes and settings:
   A. A-mode (amplitude mode).
   B. B-mode (brightness mode).
   C. M-mode (motion mode).
5. Identify display systems and settings:
   A. Scanning arm and position monitor.
   B. Oscilloscope.
   C. Storage oscilloscope.
   D. T.V. monitor.
   E. Scan converter.
   F. Real-time display.
   G. Doppler display.
   H. Character generator.
6. Identify hard copy recording devices and settings:
   A. Polaroid camera.
   B. Strip-chart recorder.
   C. Emulsion film video camera.
   D. Videotape recorder.
   E. Audio cassette recorder.
7. Identify and select coupling media:
   A. Water.
   B. Mineral oil.
   C. Aqueous gel.

PERFORMANCE GUIDE: (cont.)

8. Perform test scans and measurements, using the test object or phantom as a "patient".
9. Record scan results on hard copy record and compare to established measurements and parameters for the test object phantom.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Operate ultrasound equipment.

ENABLER

1. Recall types of ultrasound systems.
2. Identify and assemble ultrasound equipment.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to operate ultrasound equipment.

PERFORMANCE DETERMINANTS	YES	NO
1. Obtained and reviewed ultrasound system manuals.	____	____
2. Identified transmitter components and settings:		
- Transducer.	____	____
- Pulse generator.	____	____
- Pulse repeater.	____	____
- Attenuator.	____	____
3. Identified receiver components and settings:		
- Transducer.	____	____
- R F amplifier.	____	____
- Time gain compensation (TGC) or slope control.	____	____
- Demodulator.	____	____
- Video amplifier.	____	____

PERFORMANCE DETERMINANTS (cont.)	YES	NO
4. Identified display modes and settings:		
- A-mode (amplitude mode).		
- B-mode (brightness mode).		
- M-mode (motion mode).		
5. Identified display systems and settings:		
- Scanning arm and position monitor.		
- Oscilloscope.		
- Storage oscilloscope.		
- T.V. monitor.		
- Scan converter.		
- Real-time display.		
- Doppler display.		
- Character generator.		
6. Identified hard copy recording devices and settings:		
- Polaroid camera.		
- Strip-chart recorder.		
- Emulsion film video camera.		
- Videotape recorder.		
- Audio cassette recorder.		
7. Identified and selected coupling media:		
- Water.		
- Mineral oil.		
- Aqueous gel.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
8. Performed test scans and measurements, using the test object or phantom as a "patient".	______	______
9. Recorded scan results on hard copy record and compared to established measurements and parameters for the test object phantom.	______	______

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 198

TASK: Administer external beam radiation therapy to patient's treatment area.

STANDARD OF PERFORMANCE OF TASK:

The patient's treatment area must be aligned exactly as defined in treatment simulation. Treatment radiation dosage must be set, verified and double checked prior to administering radiation treatment.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Radiation treatment system
Patient's chart
Physician's orders/treatment plan
X-ray film

ENABLING OBJECTIVES:

1. Verify patient's radiation treatment plan for simulation positioning and radiation dosage.
2. Identify treatment block and prepare treatment table.
3. Recall area of anatomy to receive radiation therapy.
4. Review established department policy/procedure for administering external beam radiation therapy.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.

***RESOURCES:** (cont.)

5. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
6. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Radiation treatment unit.
8. X-ray film.
9. Treatment block.
10. Patient chart/treatment plan.
11. Checklist - Administering external beam radiation.

TEACHING ACTIVITIES:

1. Review and show students how to greet patient, verify patient's identification, and explain procedure to patient. (* 1,2,4 & 10)
2. Review and semonstrate how to assist patient onto treatment table. (* 1,3 & 4)
3. Discuss and demonstrate procedure for positioning patient so treatment area is accessible. (* 1,3 & 4)
4. Explain and demonstrate how to identify and insert treatment block into machine. (* 5,6,7 & 9)
5. Instruct and show how to align portal target light on marked treatment area. (* 5,6,7 & 8)
6. Show students how to remark treatment area if marks are fading. (* 1,4,5 & 10)
7. Discuss and stress the need to close lead lined doors or go behind lead shield prior to administering radiation treatment. (* 1,3,5,6 & 7)
8. Demonstrate how to instruct patient to remain motionless. (* 4,5 & 6)
9. Explain and demonstrate how to set the number of rads to be received and the degree of angle for treatment. (* 5,6,7, & 10)
10. Instruct and demonstrate how to turn control key on and press READY button, set button, key on button and BEAM on button. (* 5,6 & 7)
11. Show students how to determine when set treatment has been administered. (* 5,6 & 7)
12. Explain and show students how to reposition patient or treatment table to second treatment portal and repeat procedure. (* 5,6 & 7)
13. Review and demonstrate how to record treatment received in rads on patient's chart. (* 1 & 10)
14. Discuss procedure for reassuring patient about future treatments and dismiss patient. (* 1,2 & 4)

TEACHING ACTIVITIES: (cont.)

15. Monitor students as they practice administering external beam radiation therapy to patient's treatment area. (* 7,8,9 & 10)
16. Supervise and evaluate students administering external beam radiaton therapy. (* 11)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, reassure patient about treatment plan, position patient, insert treatment block in radiation treatment unit, align portal target light, take verification film, set number of RADS and degree of angle, operate radiation treatment unit controls, record number of RADS received on patient's chart and reassure patient about future treatments.

PERFORMANCE GUIDE:

1. Identify and greet patient.
2. Provide instructions and reassurance to the patient.
3. Assist patient on treatment table and position patient, so treatment area is accessible.
4. Identify and insert treatment block into treatment machine.
5. Align portal target light on marked treatment area.
6. Remark treatment area, if marks are fading.
   NOTE: Once a week take verification films to verify that treatment area is still aligned with treatment portals. After every 5th treatment, take a blood count to determine radiation's effect on blood count.
7. Close lead lined doors of treatment room or go behind lead shield.
8. Instruct patient to remain motionless.
9. Set the number of rads to be received as treatment, according to treatment plan.
10. Set the degree of angle for treatment.
11. Turn control key to on position.
12. Press READY button, set button, key on button, and BEAM on button.
13. Wait for set treatment to be administered.
14. Reposition treatment machine to second treatment portal and repeat steps 7-12.
15. Record treatment received in rads on patient's chart.
16. Reassure patient about future treatments and dismiss patient.

CHECKLIST

DUTY Performing Testing/Therapeutic procedures

TASK Administer external beam radiation therapy to patient's treatment area.

ENABLER

1. Verify patient's radiation treatment plan for simulation positioning and radiation dosage.
2. Identify treatment block and prepare treatment table.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to administer external beam radiation therapy to patient's treatment area.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Identified and greeted patient.	______	______
2.	Provided instructions and reassurance to the patient.	______	______
3.	Assisted patient on treatment table and positioned patient, so treatment area was accessible.	______	______
4.	Identified and inserted treatment block into treatment machine.	______	______
5.	Aligned portal target light on marked treatment area.	______	______
6.	Remarked treatment area, if marks were fading.	______	______
7.	Closed lead lined doors of treatment room or went behind lead shield.	______	______
8.	Instructed patient to remain motionless.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Set the number of rads to be received as treatment, according to treatment plan.	________	________
10. Set the degree of angle for treatment.	________	________
11. Turned control key to on position.	________	________
12. Pressed READY button, set button, key on button, and BEAM on button.	________	________
13. Waited for set treatment to be administered.	________	________
14. Repositioned treatment machine to second treatment portal and repeated steps 7-12.	________	________
15. Recorded treatment received in rads on patient's chart.	________	________
16. Reassured patient about future treatments and dismissed patient.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 199

TASK: Conduct localization films of intracavitary applicator or intestinal implant, prior to treatment.

STANDARD OF PERFORMANCE OF TASK:

Localization films must verify the location and positioning of the intracavitary applicator or intestinal implant, prior to administration of external beam radiation treatment. The procedure must be recorded on the patient's chart.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks in Radiation Therapy and Diagnostic Ultrasound Report #9.
V-TECS Radiographer's Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's/oncologist's request
Radiation therapy treatment plan
Patient's chart
Diagnostic x-ray unit
Graduated radiopaque markers
Radiopaque R or L markers
Procedure tray with radiopaque solutions
Dummy sources
Immobilization devices
X-ray table
Loaded film cassettes
Cassette holders
Shielding
Calipers
View box

ENABLING OBJECTIVES:

1. Verify physician's/oncologist's request for localization films.
2. Recall types of intracavitary applicators and intestinal implants.
3. Identify and assemble equipment and materials needed to conduct localization films.

ENABLING OBJECTIVES: (cont.)

4. Review established department policy/procedure for conducting localization films of intercavitary applicator or intestinal implant.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
4. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
5. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.
6. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.
7. Radiographic unit.
8. X-ray film.
9. Radiographic markers, measuring devices and shields.
10. Viewbox.
11. Patient's chart/treatment plan.
12. Checklist - conducting localization films.

TEACHING ACTIVITIES:

1. Explain how to review radiation therapy treatment plan. (* 1 & 11)
2. Review and demonstrate how to greet patient, verify patient's identification and explain procedure to patient. (* 1,2,6 & 11)
3. Review and demonstrate how to assist patient onto x-ray table and place in a supine position. (* 1,2,3 & 6)
4. Explain and show students how to place markers for lateral calculations. (* 3,4,5 & 9)
5. Show students how to shield areas not to receive radiation exposure. (* 3,4,5 & 9)
6. Instruct and demonstrate how to place loaded film cassettes in x-ray machine, center in area of interest and determine target-to-film distance. (* 4,5,7 & 8)

TEACHING ACTIVITIES: (cont.)

7. Discuss and show students how to conduct AP and lateral, stereo or single exposure with and without contrast media sand special markers. (* 3,4,5,7,8 & 9)
8. Review procedure for processing x-ray films. (* 1,3 & 8)
9. Instruct and demonstrate how to place processed radiographs on viewbox and verify view. (* 3,4,5 & 10)
10. Demonstrate how to review views and consult physician/oncologist concerning locations and positioning of applicator or implant prior to treatment. (* 1 & 11)
11. Discuss methods for repeating procedure if physician/oncologist requests additional views. (* 1 & 11)
12. Review and demonstrate how to label radiographs with patient identification. (* 1,3,5 & 11)
13. Discuss and show how to record procedure on patient's chart and radiation treatment plan. (* 1,3 & 11)
14. Monitor students as they practice conducting localization films of intracavitary applicator or intestinal implant. (* 7,8,9.10 & 11)
15. Supervise and evaluate students conducting localization films of intracavitary applicator or intestinal implant. (* 12)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain the procedure, position patient, position markers and shields, take localization films, process films, verify films on viewbox, label radiographs and record procedure on patient's chart/treatment plan.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Review radiation therapy treatment plan.
3. Greet patient, verify identification, and explain procedure.
4. Assist patient onto x-ray table and place patient in a supine position in the center of the table.
5. Place markers for lateral calculations.
6. Shield areas not to receive radiation exposure.
7. Place loaded film cassettes in x-ray machine, center in area of interest and determine target-to-film distance.

PERFORMANCE GUIDE: (cont.)

8. Conduct AP and lateral, stereo or single exposure with and without contrast media and special markers.
9. Process x-ray films.
10. Place processed radiographs on viewbox and verify views.
11. Note views and consult physician/oncologist concerning locations and positioning of applicator or implant, prior to patient receiving radiation therapy treatment.
12. Repeat steps 4-11, if physician/oncologist requests additional views.
13. Label radiographs with patient identification information.
14. Record procedure on patient's chart and radiation treatment plan.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Conduct localization films of intracavitary applicator or intestinal implant, prior to treatment.

ENABLER

1. Verify physician's/oncologist's request for localization films.
2. Recall types of intracavitary applicators and intestinal implants.
3. Identify and assemble equipment and materials needed to conduct localization films.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct localization films of intracavitary applicator or intestinal implant, prior to treatment.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Verified physician's/oncologist's request.		
2.	Reviewed radiation therapy treatment plan.		
3.	Greeted patient, verified identification, and explained procedure.		
4.	Assisted patient onto x-ray table and placed patient in a supine position in the center of the table.		
5.	Placed markers for lateral calculations.		
6.	Shielded areas not to receive radiation exposure.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
7.	Placed loaded film cassettes in x-ray machine, centered in area of interest and determined target-to-film distance.	_______	_______
8.	Conducted AP and lateral, stereo or single exposure with and without contrast media and special markers.	_______	_______
9.	Processed x-ray films.	_______	_______
10.	Placed processed radiograph's on viewbox and verified views.	_______	_______
11.	Noted views and consulted physician/oncologist concerning locations and positioning of applicator or implant, prior to patient receiving radiation therapy treatment.	_______	_______
12.	Repeated steps 4-11, if physician/oncologist requested additional views.	_______	_______
13.	Labeled radiographs with patient identification information.	_______	_______
14.	Recorded procedure on patient's chart and radiation treatment plan.	_______	_______

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 200

TASK: Calibrate well counter and probes.

STANDARD OF PERFORMANCE OF TASK:

The calibrated readings must be within the established range of activity for the reference standard in use and department policy.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Radionuclide source
Quality control log
Well counter and probes
Standard radionuclide source
Range of activity levels for the standard

ENABLING OBJECTIVES:

1. Locate well counters and probes to be calibrated.
2. Identify established range of activity for the reference standard to be used.
3. Review established department procedure for calibrating well counter and probes.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
5. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

***RESOURCES:** (cont.)

6. Cusworth, R., (1983). Quality assurance in diagnostic radiology: An eight-step methodology (lesson 1-3). St. Louis, MO: C.V. Mosby Company.
7. Well counter and probe.
8. Radionuclide reference standard source.
9. Quality control log.
10. Checklist - Calibrating well counter and probes.

TEACHING ACTIVITIES:

1. Conduct a class discussion on reference standards, relative to probe or detector. (* 5,6 & 8)
2. Explain and demonstrate how to select the energy range for the radionuclide source being evaluated. (* 1,2 & 3)
3. Instruct and show students how to verify and record the activity level per department protocol on the apporved forms. (* 1)
4. Explain and demonstrate how to remove source from the measuring container and place back in the storage container. (* 2,3,4 & 8)
5. Identify and discuss method for measuring how to record readings. (* 1,2,3,5 & 8)
6. Demonstrate how to verify and measure room background activity according to manufacturer's instructions. (* 5,6 & 7)
7. Identify and show how to record the results in quality control log. (* 5,6 & 9)
8. Explain and demonstrate how to analyze and verify that the limits are within the acceptable established range. (* 1,5 & 6)
9. Show students how to repeat procedure if readings are outside established limits.
10. Explain and demonstrate notification procedure when source remains outside for established limits. (* 1,5 & 6)
11. Monitor students as they practice calibrating well counter and probes. (* 7,8 & 9)
12. Supervise and evaluate students calibrating well counter and probes. (* 10)

CRITERION-REFERENCED MEASURE:

The student must position reference standard, set energy range for standard, record count rate of standard, remove standard and check background count, compare readings with established range, record findings in quality control log and notify radiation officer if readings are outside established limits.

PERFORMANCE GUIDE:

1. Position reference standard source relative to probe or detector.
2. Set energy range for radionuclide standard used.
3. Check/record count rate of standard radionuclide source.
4. Remove standard radionuclide source.
5. Check/record background count.
6. Compare readings to established range of activity levels for standard radionuclide source.
7. Repeat procedure, if readings are outside established limits.
8. Notify supervisor or Radiation Safety Officer, if readings remain outside established limits.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Calibrate well counter and probes.

ENABLER

1. Locate well counters and probes to be calibrated.
2. Identify established range of activity for the reference standard to be used.
3. Review established department procedure for calibrating well counter and probes.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to calibrate well counter and probes.

PERFORMANCE DETERMINANTS	YES	NO
1. Positioned reference standard source relative to probe or detector.	______	______
2. Set energy range for radionuclide standard used.	______	______
3. Checked/recorded count rate of standard radionuclide source.	______	______
4. Removed standard radionuclide source.	______	______
5. Checked/recorded background count.	______	______
6. Compared readings to established range of activity levels for standard radionuclide source.	______	______
7. Repeated procedure, if readings were outside established limits.	______	______
8. Notified supervisor or Radiation Safety Officer, if readings remained outside established limits.	______	______

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 201

TASK: Calculate biological half-life clearance.

STANDARD OF PERFORMANCE OF TASK:

The prescribed dosage must be administered to the patient, aseptically and without infiltration. Blood samples must be drawn aseptically in quantities indicated by the procedure and at the specified times.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Physician's request
Patient
Patient's chart
Recording form
Collection system
Radiopharmaceutical dosage
Pre-calibrated radiation well counter
Semi-log graph paper

ENABLING OBJECTIVES:

1. Verify physician's orders/request.
2. Identify and locate reference standard to be used.
3. Identify and assemble equipment and supplies needed to calculate biological half-life clearance.
4. Review established department procedure for calculating biological half-life clearance.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). _Primary health care handbook: Guideline for patient education_. Boston, MA: Little, Brown and Company.
3. Bernier, D., Langan, K., & Wells, D. (1981). _Nuclear medicine technology and techniques_. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

4. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
5. Billinghurst, M., & Fritzberg, A. (1981). Chemistry for nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
7. Collection system.
8. Radiopharmaceutical dosage.
9. Well counter.
10. Graph paper.
11. Recording form.
12. Patient's chart.
13. Checklist - Calculating biological half-life clearance.

TEACHING ACTIVITIES:

1. Review and demonstrate how to greet patient, verify patient's identification and explain procedure to patient. (* 1,2 & 12)
2. Conduct class discussion on aseptic technique for performing venopuncture. (* 3,4 & 6)
3. Demonstrate venopuncture in accordance with laboratory protocol using the prescribed collecting system. (* 3,4,6 & 7)
4. Discuss what baseline represents. (* 3,4,5 & 6)
5. Review prescribed methods to administering radiopharmaceutical on drug. (* 1)
6. Demonstrate how to administor dose or medication in accordance with physician's orders and department policy. (* 1,2,5,6 & 8)
7. Conduct discussion on interpreting patient reaction/response and monitoring for adverse effects. (* 1,2 & 6)
8. Review and demonstrate how to draw blood at indicated times using aseptic venopuncture techniques. (* 3,4,5,6 & 7)
9. Show how to label the required tubes/samples according to time drawn and department policy. (* 1)
10. Review and demonstrate how to accurately record procedure in patient's chart. (* 1,2,6 & 12)
11. Review and demonstrate how to obtain the activity count on samples using the counter. (* 3,4,5 & 9)

TEACHING ACTIVITIES: (cont.)

12. Instruct and demonstrate how to prepare and aliquot in the event the count rate exceeds the range of the counter. (* 3,4 & 5)
13. Show how to dilute the sample in volumetric flask by department policy. (* 1)
14. Instruct and demonstrate how to obtain the activity level for the standard. (* 3,4 & 5)
15. Explain and demonstrate how to calculate the activity level in accordance with dilution ration used. (* 3,4 & 5)
16. Review and demonstrate how to obtain room radiation background counts. (* 3,4 & 5)
17. Explain and show how to calculate the activity level of the samples, standards and controls. (* 3,4 & 5)
18. Explain and demonstrate how to plot the resultant activity levels on the graph against known values. (* 10)
19. Demonstrate how to calculate the value of T 1/2 using formula. (* 3 & 4)
20. Review and show how to record results on recording forms. (* 1 & 11)
21. Monitor students as they practice calculating biological half-life clearance. (* 7,8,9,10,11 & 12)
22. Supervise and evaluate students calculating biological half-life clearance. (* 13)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification, explain procedure, draw patients blood, arrange and label samples, record procedure on patient's chart, prepare aliquot of reference standard, count reference standard, adjust reading for dilution factor, calculate activity, plot assay results and record results on recording form.

PERFORMANCE GUIDE:

1. Verify patient's name.
2. Verify order(s).
3. Explain procedure to patient.
4. Draw patient's blood for baseline, when indicated.
5. Administer radiopharmaceutical or prescribed drug to patient.
6. Monitor patient's response.
7. Draw patient's blood at indicated times.
8. Arrange/label samples according to times drawn.
9. Record procedure on patient's chart.

PERFORMANCE GUIDE: (cont.)

10. Count samples.
11. Prepare aliquot of reference standard for counting, diluting in volumetric flask, if count rate is too high.
12. Count reference standard.
13. Adjust reading for dilution factor, if necessary.
14. Count background.
15. Calculate activity of each sample.
16. Plot assay results on graph paper.
17. Determine T 1/2.
18. Record results on recording form.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Calculate biological half-life clearance.

ENABLER

1. Verify physician's orders/request.
2. Identify and locate reference standard to be used.
3. Identify and assemble equipment and supplies needed to calculate biological half-life clearance.

STUDENT'S NAME________________________ **DATE**__________

EVALUATOR'S NAME______________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to calculate biological half-life clearance.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Verified patient's name.		
2.	Verified order(s).		
3.	Explained procedure to patient.		
4.	Drew patient's blood for baseline, when indicated.		
5.	Administered radiopharmaceutical or prescribed drug to patient.		
6.	Monitored patient's response.		
7.	Drew patient's blood at indicated times.		
8.	Arranged/labeled samples according to times drawn.		
9.	Recorded procedure on patient's chart.		
10.	Counted samples.		
11.	Prepared aliquot of reference standard for counting, diluting in volumetric flask if count rate is too high.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
12.	Counted reference standard.	________	________
13.	Adjusted reading for dilution factor, if necessary.	________	________
14.	Counted background.	________	________
15.	Calculated activity of each sample.	________	________
16.	Plotted assay results on graph paper.	________	________
17.	Determined T 1/2.	________	________
18.	Recorded results on recording form.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 202

TASK: Calculate in-vivo volume of body fluids.

STANDARD OF PERFORMANCE OF TASK:

The radiopharmaceutical must be administered aseptically, without loss or infiltration, and blood samples must be drawn aseptically in the quantities indicated by the procedure and at the specified times. The calculated volume must be within + 10% of the actual volume of body fluids.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Procedure request
Centrifuge
Patient
Assayed radiopharmacetical
Patient's chart
Dosage
Precision pipettes
Diluent
Collection system
Calibrated radiation well
Volumetric flask
Counter
Fluid volume chart
Counting tubes/containers

ENABLING OBJECTIVES:

1. Verify physician's order/request for adminstration of a radiopharmaceutical.
2. Identify method of administering the radiopharmaceutical to the patient.
3. Identify and assemble equipment and materials needed to calculate in-vivo volume of body fluids.
4. Recall procedure for drawing blood samples aseptically.
5. Review established department policy/procedure for calculating in-vivo volume of body fluids.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
4. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
5. Kuni, C., & Klingensmith, W. (1983). Atlas of radionuclide hepatobiliary imaging. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
6. Reference standard.
7. Assayed radiopharmaceutical.
8. Collection system.
9. Precision pipettes and volumetric flasks.
10. Patient's chart.
11. Checklist - Calculating in-vivo volume of body fluid.

TEACHING ACTIVITIES:

1. Review and show students how to greet patient, verify patient identification and explain procedure to patient. (* 1,2 & 9)
2. Discuss what a reference standard is and identify location of reference standard. (* 3,4,5 & 6)
3. Instruct students on how to verify prescribed dosage of assayed radiopharmaceutical. (* 1,7 & 10)
4. Explain and show students how to acquire and adminster known volume/activity of prescribed dosage using prescribed method. (* 3,4,5 & 7)
5. Instruct students to observe patient's condition for adverse reactions. (* 1,2 & 3)
6. Review and demonstrate how to collect blood samples at prescribed times in accordance with hospital policy. (* 1,3,4,5,8 & 9)
7. Show students how to label samples. (* 1,3,4 & 5)
8. Explain and demonstrate how to obtain hematocrit level. (* 3,4 & 5)
9. Explain and demonstrate how to prepare the aliquot of samples by dispensing the required volume into labeled tubes. (* 3,4,5,8 & 9)
10. Review and show how to count the amount of activity present using the counter. (* 3 & 4)

TEACHING ACTIVITIES: (cont.)

11. Explain and demonstrate how to prepare the reference standard in accordance with department procedures. (* 3,4,5 & 6)
12. Demonstrate how to count reference standards. (* 3,4 & 5)
13. Explain and show how to correct reading for dilution factor. (* 1,3 & 5)
14. Instruct students to obtain activity counts for background radiation. (* 1,3 & 4)
15. Explain and demonstrate how to calculate volume of of body fluids, using dilution formula. (* 3,4 & 5)
16. Explain and demonstrate how to calculate expected norms using patient information. (* 3,4 & 5)
17. Monitor students as they practice calculating in-vivo volume of body fluids. (* 6,7,8,9 & 10)
18. Supervise and evaluate students calculating in-vivo volume of body fluids. (* 11)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, locate reference standard, administer radiopharmaceutical to patient, monitor patient, take timed blood samples, determine hematocrit level, prepare aliquot of sample, count sample, prepare aliquot of reference standard, count reference standard, adjust for dilution factor, count background, calculate volume of body fluids and calculate expected norms.

PERFORMANCE GUIDE:

1. Verify patient's name.
2. Verify examination ordered.
3. Explain procedure to patient.
4. Set aside reference standard.
5. Administer known volume/activity of prescribed dosage.
6. Monitor patient's response.
7. Obtain timed blood samples.
8. Obtain hematocrit level.
9. Prepare aliquot of sample(s) for counting.
10. Count sample(s).
11. Prepare aliquot of reference standard for counting, diluting in volumetric flask, if count rate is too high.
12. Count reference standard.
13. Correct reading for dilution factor, if necessary.
14. Count background.

PERFORMANCE GUIDE: (cont.)

15. Calculate volume of body fluids, using dilution formula.
16. Calculate expected norms, using patient's height, weight, and age.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures.

TASK Calculate in-vivo volume of body fluids.

ENABLER

1. Identify method of administering the radiopharmaceutical to the patient.
2. Identify and assemble equipment and materials needed to calculate in-vivo volume of body fluids.
3. Recall procedure for drawing blood samples aseptically.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to calculate in-vivo volume of body fluids.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Verified patient's name.	______	______
2.	Verified examination ordered.	______	______
3.	Explained procedure to patient.	______	______
4.	Set aside reference standard.	______	______
5.	Administered known volume/activity of prescribed dosage.	______	______
6.	Monitored patient's response.	______	______
7.	Obtained timed blood samples.	______	______
8.	Obtained hematocrit level.	______	______
9.	Prepared aliquot of sample(s) for counting.	______	______
10.	Counted sample(s).	______	______
11.	Prepared aliquot of reference standard for counting, diluting in volumetric flask if count rate was too high.	______	______

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
12.	Counted reference standard.	________	________
13.	Corrected reading for dilution factor, if necessary.	________	________
14.	Counted background.	________	________
15.	Calculated volume of body fluids, using dilution formula.	________	________
16.	Calculated expected norms, using patient's height, weight, and age.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 203

TASK: Calculate percent activity in excreted biological specimen.

STANDARD OF PERFORMANCE OF TASK:

Radiation safety practices must be followed at all times, while collecting and handling the specimen. The specimen activity count must be compared to a reference standard count. The results must be calculated and recorded on the recording forms.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Request for a procedure
Diluent
Patient
Volumetric flask
Patient's chart
Refrigerator
Recording forms
Labels
Radiopharmaceutical dose
Calibrated radiation well counter
Specimen containers
Precision pipettes
Counting tubes/containers

ENABLING OBJECTIVES:

1. Recall safety procedures for collecting and handling excreted biological specimen.
2. Identify reference standard to be compared to specimen.
3. Identify type of excreted biological specimen to be collected.
4. Review established department policy/procedure for calculating activity in excreted biological specimen.

*RESOURCES:

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
4. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
5. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.
6. Radiopharmaceutical dose.
7. Calibrated well counter.
8. Specimen collection and measurement tools.
9. Patient's chart/recording form.
10. Reference standard.
11. Checklist - Calculating percent activity in excreted biological specimen.

TEACHING ACTIVITIES:

1. Review and demonstrate how to greet patient, verify patient's identification and explain procedure to patient. (* 1,2 & 9)
2. Identify location of reference standard and instruct students to set aside reference standard. (* 1,3,4, & 10)
3. Discuss proper procedure for administering radiopharmaceutical stressing aseptic technique and infection control. (* 1,3,4 & 5)
4. Demonstrate how to administer radiopharmaceutical orally and through intravenous infusion. (* 3,4 & 5)
5. Review and show students how to monitor patient for any abnormal or adverse reactions. (* 1 & 3)
6. Demonstrate how to instruct the nursing personnel concerning times, hazards and warnings associated with collecting biological specimen. (* 3,4 & 5)
7. Explain and demonstrate how to arrange and label the samples according to established collection times. (* 3,4 & 5)
8. Instruct and show students how to prepare aliquot of specimen in accordance with kit or department policy. (* 3,4 & 5)
9. Review and demonstrate how to count samples using counting devices. (* 1 & 7)

TEACHING ACTIVITIES: (cont.)

10. Instruct and demonstrate how to prepare aliquot of reference standard for counting per kit protocol and dilute per dilution protocol when required. (* 3,4 & 10)
11. Show students how to count reference standard. (* 3,4,5 & 10)
12. Explain and demonstrate how to calculate dilution factors as required. (* 3,4 & 5)
13. Review how to obtain a background count. (* 1 & 3)
14. Explain and demonstrate how to calculate the results based on the acquired data in accordance with the kit, manufacturer or department policy. (* 1)
15. Show students how to record results on recording forms. (* 9)
16. Monitor students as they practice calculating percent activity in excreted biological specimen. (* 6,7,8,9 & 10)
17. Supervise and evaluate students calculating percent activity in excreted biological specimens. (* 11)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, locate reference standard, administer radiopharmaceutical, monitor patient, collect biological specimen, label samples, prepare aliquot of specimen, count sample, prepare aliquot of reference standard, adjust for dilution factors, count background, calculate results and record results on recording forms.

PERFORMANCE GUIDE:

1. Verify patient's name.
2. Verify order/request.
3. Explain procedure to patient.
4. Set aside reference standard.
5. Administer radiopharmaceutical.
6. Monitor patient's response.
7. Instruct patient or nurse to collect biological specimen for required period of time.
8. Arrange/label samples, according to time drawn.
9. Prepare aliquot of specimen for counting.
10. Count sample.
11. Prepare aliquot of reference standard for counting, diluting in volumetric flask if count rate is too high.
12. Count reference standard.

PERFORMANCE GUIDE: (cont.)

13. Adjust reading for dilution factor.
14. Count background.
15. Calculate results.
16. Record results on recording forms.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Calculate percent activity in excreted biological specimen.

ENABLER

1. Identify reference standard to be compared to specimen.
2. Identify type of excreted biological specimen to be collected.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to calculate percent activity in excreted biological specimen.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified patient's name.	_______	_______
2.	Verified order/request.	_______	_______
3.	Explained procedure to patient.	_______	_______
4.	Set aside reference standard.	_______	_______
5.	Administered radiopharmaceutical.	_______	_______
6.	Monitored patient's response.	_______	_______
7.	Instructed patient or nurse to collect biological specimen for required period of time.	_______	_______
8.	Arranged/labeled samples, according to time drawn.	_______	_______
9.	Prepared aliquot of specimen for counting.	_______	_______
10.	Counted sample.	_______	_______

	PERFORMANCE DETERMINANTS (cont.)	**YES**	**NO**
11.	Prepared aliquot of reference standard for counting, diluting in volumetric flask if count rate was too high.		
12.	Counted reference standard.		
13.	Adjusted reading for dilution factor.		
14.	Counted background.		
15.	Calculated results.		
16.	Recorded results on recording forms.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 204

TASK: Calculate percent uptake in target organ.

STANDARD OF PERFORMANCE OF TASK:

The prescribed dose must be administered without loss of the radiopharmaceutical and the radiation counts must be made at the time(s), geometry, and under counting conditions specified by the protocol, using radiation safety practices.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Request
Calculator
Patient
Graph paper
Patient's chart
Diluent
Radiopharmaceutical dose
Administration apparatus
Calibrated scintillation probe
Volumetric flask
Counting tubes/containers
Department protocol for procedure

ENABLING OBJECTIVES:

1. Verify physician's orders/request for nuclear medicine study.
2. Identify type of radiopharmaceutical to be administered.
3. Recall safety practices and procedures for calculating percent uptake in target organ.
4. Locate reference standard to be used for count.
5. Review established department policy/procedure for calculating percent uptake in target organ.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
4. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
5. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.
6. Radiopharmaceutical dose.
7. Calibrated scintillation probe and well counter.
8. Volumetric flask and counting tubes/containers.
9. Graph paper.
10. Patient's chart.
11. Reference standard.
12. Checklist - Calculating percent uptake in target organ.

TEACHING ACTIVITIES:

1. Review and show students how to greet patient, verify patient's identification and explain procedure to patient. (* 1,2 & 10)
2. Explain and demonstrate how to acquire baseline counts for calculating the percent uptake of the target organ. (* 3,4 & 5)
3. Discuss and show student's different types of reference standard. (* ,3,4, & 11)
4. Review procedure and demonstrate how to administer radiopharmaceutical to the patient using aseptic technique. (* 3,4,5 & 6)
5. Conduct discussion on abnormal/adverse reactions. (* 1,3,4 & 5)
6. Instruct and demonstrate how to position the probe over the area of interest using prescribed geometry. (* 3,4,5 & 7)
7. Review and show students how to acquire counts at prescribed time. (* 3,4 & 5)
8. Review how to prepare aliquot of reference standard for counting and dilute per protocol when required. (* 1,3,4,8 & 11)
9. Instruct students how to initiate activity acquisition of the reference standard at the same geometry that the region of interest was obtained. (* 3,4,7 & 11)

TEACHING ACTIVITIES: (cont.)

10. Explain and demonstrate how to adjust reading for dilution factor if necessary. (* 3,4,8 & 11)
11. Review and show how to plot/calculate the percent uptake using the formula provided in department procedure. (* 1,3,4,5 & 9)
12. Discuss and demonstrate how to record and report the results as required. (* 1,3,4, & 10)
13. Monitor students as they practice calculating percent uptake in target organ. (* 6,7,8,9,10 & 11)
14. Supervise and evaluate students calculating percent uptake in target organ. (* 12)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure, take baseline counts, administer radiopharmacuetical, monitor students for reactions, position probe, take counts over area of interest, prepare aliquot of reference standard, take count of reference standards, adjust reading for dilution, calculate and plot percent uptake in target organ and record results on patient's chart.

PERFORMANCE GUIDE:

1. Verify patient's name.
2. Verify order(s).
3. Explain procedure to patient.
4. Acquire baseline counts, if indicated.
5. Set aside reference standard.
6. Administer radiopharmaceutical to patient.
7. Monitor patient's response.
8. Position probe over area of interest, using geometry specified by protocol.
9. Acquire counts at prescribed time(s).
10. Prepare aliquot of reference standard for counting, diluting in volumetric flask, if count rate is too high.
11. Acquire reference standard counts.
12. Adjust reading for dilution factor, if necessary.
13. Plot or calculate percent uptake of radiopharmaceutical.
14. Record results.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Calculate percent uptake in target organ.

ENABLER

1. Verify physician's orders/request for nuclear medicine study.
2. Identify type of radiopharmaceutical to be administered.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to calculate percent uptake in target organ.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified patient's name.		
2.	Verified order(s).		
3.	Explained procedure to patient.		
4.	Acquired baseline counts, if indicated.		
5.	Set aside reference standard.		
6.	Administered radiopharmaceutical to patient.		
7.	Monitored patient's response.		
8.	Positioned probe over area of interest, using geometry specified by protocol.		
9.	Acquired counts at prescribed time(s).		
10.	Prepared aliquot of reference standard for counting, diluting in volumetric flask if count rate was too high.		
11.	Acquired reference standard counts.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
12. Adjusted reading for dilution factor, if necessary.		
13. Plotted or calculated percent uptake of radiopharmaceutical.		
14. Recorded results.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 205

TASK: Calculate activity level.

STANDARD OF PERFORMANCE OF TASK:

The value for r2 must be equal to or greater than 0.98 with calculation errors not to exceed 1%.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Calculator
Log paper
Data in counts per minute for each sample

ENABLING OBJECTIVES:

1. Recall methods for calculating activity level.
2. Locate data for samples need that activity levels counted.
3. Review established department policy/procedure for calculating percent activity levels.

***RESOURCES:**

1. Department policy/procedure manual.
2. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.
3. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
4. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
5. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.

***RESOURCES:** (cont.)

6. Data in counts per minute.
7. Programmable calculator.
8. Manual (hand held) calculator.
9. Log paper.
10. Checklist - Calculating activity level.

TEACHING ACTIVITIES:

1. Conduct class discussion on methods of data programmable or manual and what they mean. (* 2,3 & 4)
2. Review procedure for entering data into programmable calculator. (* 1 & 7)
3. Explain and demonstrate how to determine activity level using programmable automatic calculator.
4. Review formulas for percent bound and relative percent bound. (* 2,3 & 4)
5. Explain and demonstrate how to determine activity level using hand held calculator. (* 2,3,6 & 8)
6. Demonstrate how to calculate/record the correlation between know and unknown samples.
7. Identify and explain proper procedure to notify appropriate personnel if r2 is less than 0.98. (* 1)
8. Instruct and show students how plot assay results. (* 5 & 9)
9. Monitor students as they practice calculating activity level. (* 6,7,8 & 9)
10. Supervise and evaluate students calculating activity level. (* 10)

CRITERION-REFERENCED MEASURE:

The student must determine method of data reduction, calculate activity level, plot assay results and notify appropriate personnel if r2 remains below 0.98.

PERFORMANCE GUIDE:

1. Determine method of data reduction: programmable or manual.
2. Determine activity level using:
    A. Programmable Automatic Calculator:
        1. Review protocol for order of data submission.
        2. Enter data (cpm) for each standard, control, and patient as directed.
        3. Initiate calculation of percent bound for each sample.

PERFORMANCE GUIDE: (cont.)

4. Obtain curve, calculate patient concentrations, and r2.
5. Report/record results.

B. Hand Held Calculator:

Note: Hand held calculator may be used in performance of any of following calculations: relative percent bound, logit plot of relative percent bound, traditional percent bound, or counts per minute (cpm).

1. Calculate percent bound for each standard, control, and patient, using method chosen above.
2. Calculate relative percent bound, using formula:

$$\text{relative percent bound} = \frac{\text{observed cpm}}{\text{cpm of 0.0 std.}}$$

3. Construct logit plot of relative percent bound standards, controls, and patient samples.
4. Calculate percent of antigen bound (traditional) for each standard, control, and patient, using formula:

$$\text{percent bound} = \frac{\text{observed cpm}}{\text{total count (cpm)}}$$

5. Determine raw counts per minute (cpm) for each standard, control, and patient.
6. Calculate average for each set of duplicate samples.
7. Calculate percent difference between pairs of samples: there should not be more than + or - 5% between them.
8. Calculate/record the correlation (r) between the counts of the known and unknown samples.
9. Recount the sample, if r2 is less than 0.98.

3. Notify appropriate personnel, if r2 remains below 0.98.
4. Plot assay results.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Calculate activity level.

ENABLER

1. Recall methods for calculating activity level.
2. Locate data for samples that need activity levels counted.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to calculate activity level.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Determined method of data reduction: programmable or manual.		
2.	Determined activity level using: Programmable Automatic Calculator.		
3.	Reviewed protocol for order of data submission.		
4.	Entered data (cpm) for each standard, control, and patient as directed.		
5.	Initiated calculation of percent bound for each sample.		
6.	Obtained curve, calculated patient concentrations, and r2.		
7.	Reported/recorded results.		
8.	Calculated percent bound for each standard, control, and patient, using method chosen above.		
9.	Calculated relative percent bound, using formula. relative percent bound = $\frac{\text{observed cpm}}{\text{cpm of 0.0 std.}}$		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
10. Constructed logit plot of relative percent bound standards, controls, and patient samples.	________	________
11. Calculated percent of antigen bound (traditional) for each standard, control, and patient, using formula: percent bound = $\frac{\text{observed cpm}}{\text{total count (cpm)}}$	________	________
12. Determined raw counts per minute (cpm) for each standard, control, and patient.	________	________
13. Calculated average for each set of duplicate samples.	________	________
14. Calculated percent difference between pairs of samples: there should not be more than + or - 5% between them.	________	________
15. Calculated/recorded the correlation (r) between the counts of the known and unknown samples.	________	________
16. Recounted the sample, if r2 was less than 0.98.	________	________
17. Notified appropriate personnel, if r2 remained below 0.98.	________	________
18. Plotted assay results.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 206

TASK: Plot assay results.

STANDARD OF PERFORMANCE OF TASK:

Determine the method of plotting the curve dictated by the method of calculation; the points must be plotted without error.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Graph paper
Data on the percent bound
Concentration for each standard tube
Percent bound for each unknown

ENABLING OBJECTIVES:

1. Identify method used to calculate data.
2. Recall methods of plotting assay results curve.
3. Review established department procedure for plotting assay results.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Graph paper.
5. Percent bound data.
6. Concentration data.
7. Checklist - Plotting assay results.

TEACHING ACTIVITIES:

1. Conduct discussion on methods of plotting curves and how to determine the most reliable curve plot. (* 1,2 & 3)

TEACHING ACTIVITIES: (cont.)

2. Explain and demonstrate how to select method plotting curve as dictated by method of calculation. (* 2,3 & 4)
3. Explain and show how to plot percent bound or counts per minute on y-axis. (* 2,3,4 & 5)
4. Demonstrate how to plot concentrations of each standard on x-axis. (* 2,3,4 & 6)
5. Discuss standard curve and what an acceptable curve means. (* 1,2 & 3)
6. Instruct and demonstrate how to construct standard curve to form line of best fit. (* 4,5 & 6)
7. Discuss and show how to read concentration of each control and patient from standard curve. (* 1,2,3 & 6)
8. Review and demonstrate how to report/record concentration for each unknown. (* 1)
9. Monitor students as they practice plotting assay results. (* 4,5 & 6)
10. Supervise and evaluate students plotting assay results. (* 7)

CRITERION-REFERENCED MEASURE:

The student must select method of plotting curve, plot percent bound data on x-axis, plot concentration data on y-axis, construct standard curve, read concentrations and record concentration for unknowns.

PERFORMANCE GUIDE:

1. Select method of plotting curve, as dictated by method of calculation.
2. Plot percent bound or counts per minute on y-axis.
3. Plot concentrations of each standard on x-axis.
4. Construct standard curve to form line of best fit between points plotted for standards.
5. Read concentration of each control and patient from standard curve.
6. Report/record concentration for each unknown.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Plot assay results.

ENABLER

1. Identify method used to calculate data.
2. Recall methods of plotting assay results curve.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to plot assay results.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Selected method of plotting curve, as dictated by method of calculation.		
2.	Plotted percent bound or counts per minute on y-axis.		
3.	Plotted concentrations of each standard on x-axis.		
4.	Constructed standard curve to form line of best fit between points plotted for standards.		
5.	Read concentration of each control and patient from standard curve.		
6.	Reported/recorded concentration for each unknown.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 207

TASK: Review quality control graphs.

STANDARD OF PERFORMANCE OF TASK:

The control must be within + or - 2 standard deviations on the graph when compared with the accumulated results for the same lot of control material.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Calculator
Graph paper
Results from quality control material
Control concentration from radioassay test

ENABLING OBJECTIVES:

1. Identify quality control material.
2. Collect control value data from previous runs.
3. Review established department protocol for reviewing quality control graphs.

***RESOURCES:**

1. Department policy/procedures manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C. V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
5. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.
6. Ballinger, P., (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V.Mosby Company.

***RESOURCES:** (cont.)

7. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
8. Quality control graph.
9. Standard deviation points and control concentrations.
10. Checklist - Reviewing quality control graphs.

TEACHING ACTIVITIES:

1. Present lecture on plotting quality control graphs. (* 1,2,3,5 & 15)
2. Conduct a class discussion on the function and importance of quality control material. (* 1,2,3,4,5,6 & 7)
3. Explain what a quality control graph represents and how itis used. (* 1,2,3,4 & 5)
4. Discuss the meaning of mean value and standard deviation. (* 2,3 & 5)
5. Demonstrate how to calculate mean value and standard deviation of a quality control material. (* 2,3 & 5)
6. Explain the function of the X & Y axis on a quality control graph. (* 2,3 & 5)
7. Discuss what standard deviation points are. (* 2,3 & 5)
8. Demonstrate how to plot the X & Y axis on a quality control graph. (* 2,3,5 & 8)
9. Explain what control concentrations and control values are. (* 2,3 & 5)
10. Demonstrate how to calculate control concentrations and control values and how to plot them on a quality control graph. (* 2,3,5 & 8)
11. Explain how to evaluate a quality control material to verify if it is within acceptable limits.
12. Discuss the meaning of "out of control" values. (* 2 & 3)
13. Demonstrate how to correct for control values that are out.
14. Conduct a class discussion on what controls the reliability of the quality control graph results and the importance of its accuracy. (* 1,2,3,4,5,6 & 7)
15. Monitor students while they practice plotting a quality control graph. (* 9)
16. Assign students to review a quality control graph. (* 10)

CRITERION-REFERENCED MEASURE:

The student must collect control value data, calculate mean values, calculate standard deviations, construct a graph, plot the control values, evaluate plotted data for acceptability and correct "out of control" or unacceptable values.

PERFORMANCE GUIDE:

1. Accumulate all results for given lot of quality control material available from previous runs sufficient to provide satisfactory response in evaluation.
2. Calculate mean value for all quality control material of same lot.
3. Calculate + or - 2 standard deviations from mean value.
4. Construct a graph with concentrations of controls on Y-axis, spaces numbered for each day on X-axis.
5. Note + or - 2 standard deviation points on Y-axis.
6. Plot control concentrations obtained for each run of given test.
7. Check after each run to be sure control is within the + or - 2 standard deviations on graph.
8. Determine steps taken to correct "out-of-control" values.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Review quality control graphs.

ENABLER

1. Identify quality control material.
2. Collect control value data from previous runs.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's performance when reviewing quality control graphs.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Accumulated all results for given lot of quality control material available from previous runs sufficient to provide satisfactory response in evaluation.		
2.	Calculated mean value for all quality control material of same lot.		
3.	Calculated + or - 2 standard deviations from mean value.		
4.	Constructed a graph with concentrations of controls on Y-axis, spaces numbered for each day on X-axis.		
5.	Noted + or - 2 standard deviations points on Y-axis.		
6.	Plotted control concentrations obtained for each run of given test.		
7.	Checked after each run to be sure control was within the + or - 2 standard deviations on graph.		
8.	Determined steps taken to correct "out-of-control" values.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 208

TASK: Perform radioassay study.

STANDARD OF PERFORMANCE OF TASK:

The study must be performed in the manner prescribed by the manufacturer of the kit, yielding a percent bound within + or - 2SD of the mean for particular assay.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Precision pipettes
Water bath
Vortex mixer
Centrifuge
Polypropylene tubes
Test tube rack
Automatic pipette
Plastic backed absorbent paper
Patient serum samples
Manufacturer's protocol for standards, controls,
Patient's samples and performance

ENABLING OBJECTIVES:

1. Identify type radioassay study to be performed.
2. Interpret manufacturer's instructions for assay.
3. Define radioassay terminology.
4. Review established department protocol for performing a radioassay study.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
5. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.
6. Whalen, J., & Balter, S. (1984). Radiation risks in medical imaging. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Radioassay study equipment.
8. Relationship of different radioassay methods chart.
9. Checklist - Performing radioassay study.

TEACHING ACTIVITIES:

1. Present lecture on preparing for a radioassay study. (* 2,3,4,5,6 & 8)
2. Discuss handling and preparation of reagents and serums. (* 1,2,3 & 4)
3. Explain tube labeling and arrangement techniques. (* 2,3 & 4)
4. Discuss different types of tubes and tube racks.
5. Demonstrate tube labeling and arrangement procedure. (* 2,3 & 4)
6. Discuss types of precision pipettes and how they are graduated. (* 2,3,4,5 & 7)
7. Demonstrate conversion methods for different pipettes. (* 2,3 & 7)
8. Demonstrate method for pipetting into a labeled tube. (* 2,3 & 7)
9. Conduct a class discussion on pros and cons of manual vs. automatic pipettes.
10. Discuss test tube vortex procedures and functions.
11. Demonstrate procedures for vortexing test tubes. (* 2,3 & 7)
12. Explain test tube incubation process and purpose.
13. Demonstrate incubation procedure. (* 2,3 & 7)
14. Discuss and demonstrate test tube centrifuge procedure. (* 2,3 & 7)
15. Present lecture on radiation protection and radioactive waste disposal. (* 1,2,3,4,5 & 6)
16. Discuss and demonstrate the procedure to decant radioactive supernatant. (* 1,2,3 & 5)
17. Demonstrate blotting procedure for radioimmunoassay tubes. (* 1,2 & 3)
18. Monitor students while they practice performing a radioassay study.
19. Assign students to a perform radioassay study. (* 9)

CRITERION-REFERENCED MEASURE:

The student must prepare the reagent and serum, label and arrange test tubes, pipette reagent, serum and sample into tubes, pipette required volume of tracer/antibody into tubes, vortex tubes, incubate tubes, centrifuge tubes, decant tubes and blot tube according to department and manufacturer's protocol.

PERFORMANCE GUIDE:

1. Remove reagents and serum from refrigerator or freezer.
2. Allow reagents and serum to stand until they stabilize at room temperature.
3. Label tubes in duplicate.
4. Arrange tubes in rack.
5. Pipette specified volume of standard, control, and patient serum into labeled tubes, using precision pipettes per manufacturer's instructions.
6. Pipette specified volume of radioionated tracer solution and/or antibody into labeled tubes, per manufacturer's instructions.
7. Vortex test tube(s) for 3-5 seconds as required.
8. Incubate tubes as required during assay, according to manufacturer's instructions.
9. Centrifuge tubes at RPM and number of minutes required by manufacturer's protocol.
10. Decant radioactive supernatant into suitable radioactive waste container.
11. Blot radioimmunoassay tubes on absorbent paper.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Perform radioassay study.

ENABLER

1. Interpret manufacturer's instructions for assay.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME_____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist when evaluating student's performance while performing a radioassay study.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Removed reagents and serum from refrigerator or freezer.		
2.	Allowed reagents and serum to stand until they stabilized at room temperature.		
3.	Labeled tubes in duplicate.		
4.	Arranged tubes in rack.		
5.	Pipetted specified volume of standard, control, and patient serum into labeled tubes, using precision pipettes per manufacturer's instructions.		
6.	Pipetted specified volume of radioionated tracer solution and/or antibody into labeled tubes, per manufacturer's instructions.		
7.	Vortexed test tube(s) for 3-5 seconds as required.		
8.	Incubated tubes as required during assay according to manufacturer's instructions.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Centrifuged tubes at RPM and number of minutes required by manufacturer's protocol.	______	______
10. Decanted radioactive supernatant into suitable radioactive waste container.	______	______
11. Blotted radioimmunoassay tubes on absorbent paper.	______	______

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 209

TASK: Separate serum from whole blood.

STANDARD OF PERFORMANCE OF TASK:

The serum samples must be of sufficient quality and quantity for the required study. Aseptic body fluid handling techniques must be used, while separating serum from red blood cells.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Centrifuge
Serum filter
Storage tube and cap
Protective attire
Patient's blood samples in labeled collection tubes

ENABLING OBJECTIVES:

1. Locate whole blood samples to be separated.
2. Recall equipment needed to separate serum from whole blood.
3. Review established department procedures for separating serum from whole blood.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.

***RESOURCES:** (cont.)

5. Blood samples in test tubes.
6. Centrifuge.
7. Serum separation and storage equipment.
8. Checklist - Separating serum from whole blood.

TEACHING ACTIVITIES:

1. Instruct students on methods for allowing blood samples to clot. (* 1 & 5)
2. Explain and show students how to load samples in centrifuge maintaining a balance. (* 2,3,5 & 6)
3. Explain and show students how to operate centrifuge. (* 1 & 6)
4. Instruct and demonstrate how to remove tubes from centrifuge and label each storage tube with proper identification and information. (* 3,4 & 7)
5. Explain and show students how to pour serum into storage tubes and cap. (* 1,2 & 7)
6. Conduct class discussion stressing the need for protective attire to prevent spread of infectious disease. (* 1,2,3 & 4)
7. Explain and show the students how to inspect the tubes visually for testing sample quantity and quality. (* 1,2,3 & 4)
8. Review proper procedure for discarding cells and collection tubes. (* 2,3 & 4)
9. Explain and show students how to freeze samples at -20 degrees C if not used immediately. (* 1 & 7)
10. Monitor students as they practice separating serum from whole blood. (* 5,6 & 7)
11. Supervise and evaluate students separating serum from whole blood. (* 8)

CRITERION-REFERENCED MEASURE:

The student must load clotted blood samples in centrifuge, centrifuge samples for ten minutes, remove tubes from centrifuge, label storage tubes, pour serum into storage tubes, cap storage tubes, inspect serum storage tubes, discard cell and collection tubes, and if not used immediately freeze serum samples.

PERFORMANCE GUIDE:

1. Allow blood samples to clot.
2. Load samples maintaining a balance in volume across from each other in centrifuge.
3. Secure lid on centrifuge.

PERFORMANCE GUIDE: (cont.)

4. Centrifuge for approximately 10 minutes at 1400 g's or greater.
5. Allow centrifuge to stop completely.
6. Remove tubes from centrifuge.
7. Label each storage tube with patient's name, test, laboratory slip number and information necessary for definite identification.
8. Pour serum into storage tubes, using protective attire as required.
9. Cap storage tubes.
10. Inspect the tubes visually for testing sample quantity and quality.
11. Discard cells and collection tubes in appropriate trash receptacle.
12. Use samples immediately or freeze at -20 degrees C.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Separate serum from whole blood.

ENABLER

1. Locate whole blood samples to be separated.
2. Recall equipment needed to separate serum from whole blood.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to separate serum from whole blood .

	PERFORMANCE DETERMINANTS	YES	NO
1.	Allowed blood samples to clot.		
2.	Loaded samples maintaining a balance in volume across from each other in centrifuge.		
3.	Secured lid on centrifuge.		
4.	Centrifuged for approximately 10 minutes at 1400 g's or greater.		
5.	Allowed centrifuge to stop completely.		
6.	Removed tubes from centrifuge.		
7.	Labeled each storage tube with patient's name, test, laboratory slip number and information necessary for definite identification.		
8.	Poured serum into storage tubes, using protective attire as required.		
9.	Capped storage tubes.		
10.	Inspected the tubes visually for testing sample quantity and quality.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
11. Discarded cells and collection tubes in appropriate trash receptacle.		
12. Used samples immediately or froze at -20 degrees C.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 210

TASK: Critique radiographic films.

STANDARD OF PERFORMANCE OF TASK:

Radiographic films must be critiqued for resolution, anatomical completeness, and diagnostic quality to provide the radiologist with high quality diagnostic information. Radiographic examination results must be reviewed with the radiologist.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Viewbox
Pen/pencil
Paper
Felt tip pen/wax pencil
Physician's request
Processed radiographic film

ENABLING OBJECTIVES:

1. Review patient's medical history.
2. Verify reason for radiographs.
3. Review established department policy for critiquing a radiograph.

***RESOURCES:**

1. Department policy/procedure manual.
2. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
3. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
4. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
5. Chesney, D., & Chesney, M. (1981). Radiographic imaging (4th ed.). Boston, MA: Blackwell Scientific Publications Ltd.

***RESOURCES:** (cont.)

6. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
7. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.
8. Radiograph viewbox.
9. Developed radiograph.
10. Checklist - Critiquing radiographs.

TEACHING ACTIVITIES:

1. Review viewbox operation procedures. (* 1,2,4 & 7)
2. Demonstrate technique for turning on the viewbox and hanging the radiograph. (* 1,2,4,7 & 8)
3. Stress importance of hanging film so that anatomy is properly displayed. (* 2,3,4,5,6 & 7)
4. Conduct class discussion on points to look for when critiquing a radiograph.
5. Show students points of interest on example radiographs. (* 2,3,5,7,8 & 9)
6. Discuss assessment of points of interest and possible problem areas. (* 1,5 & 6)
7. Question students on artifacts and possible causes. (* 2,4,7 & 9)
8. Explain procedure for reviewing radiographs with the radiologist. (* 1)
9. Stress the importance of precision and accuracy in avoiding incorrect diagnosis of conditions. (* 1,3 & 6)
10. Monitor students practicing critiquing a radiograph.
11. Assign students to critique a radiograph. (* 10)

CRITERION-REFERENCED MEASURE:

The student must position radiograph on viewbox so requested anatomy is displayed, identify points of interest, note problem areas and review the radiograph with the radiographer.

PERFORMANCE GUIDE:

1. Turn viewbox on and hang film.
2. Review the radiograph:
   A. Has the correct view been obtained?
   B. Does the view demonstrate the anatomy correctly?
   C. Is the technique optimal?
   D. Is there evidence of collimation?

PERFORMANCE GUIDE: (cont.)

2. Review the radiograph: (cont.)
    E. Is the film marked (R and L) properly?
    F. Is the patient identification correct?
    G. Does the film appear to be properly developed and fixed?
    NOTE: If the answer to any of these is "no", a repeat film should be considered. If you are uncertain of whether or not the film should be repeated, consult the advice of immediate supervisor.
3. Note points of interest and possible problem areas.
4. Review the radiographs with the radiologist.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Critique radiographic films.

ENABLER

1. Review patient's medical history.
2. Verify reason for radiographs.

STUDENT'S NAME ________________ **DATE** ________

EVALUATOR'S NAME ________________ **COURSE** ________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to critique radiographic films.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Turned viewbox on and hung film.		
2.	Reviewed the radiograph:		
	- Had the correct view been obtained?		
	- Did the view demonstrate the anatomy correctly?		
	- Was the technique optimal?		
	- Was there evidence of collimation?		
	- Was the film marked (R and L) properly?		
	- Is the patient identification correct?		
	- Did the film appear to be properly developed and fixed?		
3.	Noted points of interest and possible problem areas.		
4.	Reviewed the radiographs with the radiologist.		

DUTY: PERFORMING TESTING/THERAPUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 211

TASK: Critique ultrasound study.

STANDARD OF PERFORMANCE OF TASK:

Ultrasound study must be critiqued for resolution, anatomical detail, and diagnostic quality. Study results must be reviewed with the physician in charge.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Viewbox
Ultrasound study
Physician's request

ENABLING OBJECTIVES:

1. Recall type and purpose of ultrasound examination.
2. Review established department policy/procedure for critiquing ultrasound study.

***RESOURCES:**

1. Department policy/procedure manual.
2. Wallach, J. (1986). Interpretation of diagnostic tests. Boston, MA: Little, Brown and Company.
3. Physician's request.
4. Ultrasound study.
5. Viewbox or monitor.
6. Patient's chart.
7. Checklist - Critiquing ultrasound studies.

TEACHING ACTIVITIES:

1. Show students how to place images on the viewbox or monitor. (* 1,4 & 5)
2. Conduct class discussion on factors to evaluate when critiquing an ultrasound study. (* 1,2,3 & 4)
3. Demonstrate to students how to evaluate the images. (* 2,4 & 5)

TEACHING ACTIVITIES: (cont.)

4. Explain and show students how to update patient history with possible points of interest. (* 1 & 6)
5. Show students how to review examination results with physician in charge. (* 2,3,4 & 6)
6. Monitor students as they practice critiquing ultrasound study. (* 3,4,5 & 6)
7. Supervise and evaluate students critiquing ultrasound study. (* 6)

CRITERION-REFERENCED MEASURE:

The student must verify patient's chart, physician's request and ultrasound study results, evaluate ultrasound images, and discuss study findings with physician.

PERFORMANCE GUIDE:

1. Obtain the completed ultrasound study and place images on the viewbox.
2. Evaluate the images to verify the following:
   - A. Uniform resolution is present.
   - B. Requested anatomy has been adequately demonstrated.
   - C. All the projections are present, according to department protocol.
   - D. Anatomical detail is present.
3. Update patient history with possible points of interest.
4. Review examination results with physician in charge.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Critique ultrasound study.

ENABLER

1. Recall type and purpose of ultrasound examination.

STUDENT'S NAME________________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to critique ultrasound study.

PERFORMANCE DETERMINANTS	YES	NO
1. Obtained the completed ultrasound study and placed images on the viewbox.		
2. Evaluated the images to verify the following:		
- Uniform resolution was present.		
- Requested anatomy had been adequately demonstrated.		
- All the projections were present, according to department protocol.		
- Anatomical detail was present.		
3. Update patient history with possible points of interest.		
4. Reviewed examination results with physician in charge.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 212

TASK: Critique nuclear medicine studies.

STANDARD OF PERFORMANCE OF TASK:

Nuclear medicine study must be critiqued for resolution, anatomical completeness, details techniques, and diagnostic quality. Study results must be reviewed with the requesting physician.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Viewbox
Procedure manual
Physician's request
Nuclear medicine study

ENABLING OBJECTIVES:

1. Recall type and purpose of nuclear medicine study.
2. Review established department procedure for critiquing nuclear medicine studies.

***RESOURCES:**

1. Department policy/procedure manual.
2. Wallach, J. (1986). Interpretation of diagnostic tests. Boston, MA: Little, Brown and Company.
3. Nuclear medicine study results.
4. Physician's request.
5. Patient's chart.
6. Nuclear medicine procedure manual.
7. Viewbox or monitor.
8. Checklist - Critiquing nuclear medicine studies.

TEACHING ACTIVITIES:

1. Explain and show students how to place images from completed nuclear medicine study on the viewbox. (* 1,3 & 7)

TEACHING ACTIVITIES: (cont.)

2. Instruct and show students how to check that uniform resolution is present throughout the images. (* 1,2,3,6 & 7)
3. Explain and demonstrate how to verify that the images of the anatomy being evaluated concurs with the anatomy requested. (* 2,3,4 & 7)
4. Explain and show students to how to review the images, used to determine the projections that represents the departmental routine present and verify that the positioning is correct. (* 2,3 & 6)
5. Explain and show how to evaluate the detail of the structures demonstrated for anatomy to background rates. (* 2,3,4 & 5)
6. Review and show the students how to evaluate the study based on the factors. (* 2,3,4 & 5)
7. Conduct class discussion on possible problems or points of interest. (* 1,2,3 & 6)
8. Demonstrate how to review examination results with requesting physician. (* 2,3,6 & 7)
9. Monitor students as they practice critiquing nuclear medicine studies. (* 3,4,5,6 & 7)
10. Supervise and evaluate students critiquing nuclear medicines studies. (* 8)

CRITERION-REFERENCED MEASURE:

The student must check nuclear medicine study results for uniform resolution and anatomy requested, verify image postitioning, observe detail and backgroud ratio, elvaluate study findings and review test results with physician.

PERFORMANCE GUIDE:

1. Obtain the completed nuclear medicine study and place the images on the viewbox.
2. Check that uniform resolution is present throughout the images.
3. Verify that the images of the anatomy being evaluated concurs with the anatomy requested.
4. Review the images to determine if the projections that represent the department routine are present and that the positioning is correct to demonstrate the requested anatomy.

PERFORMANCE GUIDE: (cont.)

5. Observe the detail of the structures demonstrated for anatomy to background ratio.
6. Evaluate the study based on the findings of the above critique.
7. Note points of interest or possible problems.
8. Review examination results with the requesting physician.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Critique nuclear medicine studies.

ENABLER

1. Recall type and purpose of nuclear medicine study.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME______________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to critique nuclear medicine studies.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained the completed nuclear medicine study and placed the images on the viewbox.		
2.	Checked that uniform resolution was present throughout the images.		
3.	Verified that the images of the anatomy being evaluated concurred with the anatomy requested.		
4.	Reviewed the images to determine if the projections that represent the department routine were present and that the positioning was correct to demonstrate the requested anatomy.		
5.	Observed the detail of the structures demonstrated for anatomy to background ratio.		
6.	Evaluated the study based on the findings of the above critique.		
7.	Noted points of interest or possible problems.		
8.	Reviewed examination results with the requesting physician.		

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 213

TASK: Conduct radiation therapy portal/verification films.

STANDARD OF PERFORMANCE OF TASK:

Radiation therapy portal/verification films must confirm exact alignment of patient's planned treatment area and the external beam radiation treatment machine. Portal/verification films must show exact alignment prior to administration of radiation treatment to patient. Verification film procedure must be recorded on the patient's chart.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks in Radiation Therapy and Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

View box
X-ray film
Treatment block
Calipers
Shielding
Patient's chart
Radiopaque R or L markers
Loaded x-ray film cassettes
Graduated radiopaque markers
Physician's/oncologist's request
Radiation therapy treatment plan
External beam radiation treatment machine with x-ray unit

ENABLING OBJECTIVES:

1. Recall purpose of radiation therapy portal films.
2. Locate treatment blocks needed for portal verification.
3. Review established department procedure for conducting radiation portal/verification films.

*RESOURCES:

1. Department policy/procedure manual.
2. Fischer, D., & Marsh, J. (1982). Cancer therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
3. Hendee, W. (1981). Radiation therapy physics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
5. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.
6. Simulation tools and supplies.
7. External beam radiation treatment machine with x-ray unit.
8. Radiation treatment blocks.
9. Graduated radiopaque markers.
10. Patient's chart/treatment plan.
11. Patient with treatment markings.
12. Checklist - Conducting radiation therapy portal/verification films.

TEACHING ACTIVITIES:

1. Show students how to review radiation therapy treatment plan. (* 1,2 & 10)
2. Explain and show students how to greet patient, verify patient's identification and explain procedure to patient. (* 1,4,5 & 10)
3. Review and demonstrate how to assist patient onto examination table and position patient. (* 1,4 & 5)
4. Demonstrate how to bare patient's treatment area and verify treatment marks. (* 3,5,10 & 11)
5. Instruct and show students how to insert treatment block into treatment machine and use the light system crosshairs to center overhead x-ray tube in the center of the area of interest. (* 2,3,4,5,7 & 8)
6. Review and demonstrate how to measure the thickness of the patient in the directions in which the central x-ray will pass. (* 3,4,6 & 9)
7. Explain and show students how to place loaded film cassette in cassette tunnel and center to area of interest for AP projection. (* 1,3,4,5,6 & 7)

TEACHING ACTIVITIES: (cont.)

8. Explain and show students how to determine target-to-film distance (TFD) and collimate to area of interest including markers. (* 3,4 & 7)
9. Clear area and make AP verification films from behind lead barrier or control booth. (* 1,2,3,4 & 5)
10. Instruct and demonstrate how to reposition machine and make lateral verification films. (* 2,3,4,5 & 7)
11. Instruct and demonstrate how to process x-ray film. (* 1 & 4)
12. Show student how to place processed film on view box and verify alignment. (* 4 & 5)
13. Conduct class discussion on procedure to follow if alignment is not exact. (* 1)
14. Identify procedure used to label verification film with identification information and to record procedure on patient's chart. (* 1,4,5 & 6)
15. Monitor students as they practice conducting radiation therapy portals/verification films. (* 6,7,8,9 & 10)
16. Supervise and evaluate students conducting radiation therapy portal/verification films. (* 12)

CRITERION-REFERENCED MEASURE:

The student must verify patient's identification and explain procedure; locate patient treatment marks; insert treatment block; center light system crosshairs; measure treatment area thickness and set automatic exposure; determine target-to-film distance (TDF) and collimate to area of interest; make AP verification films; make lateral verification films; process radiographs; verify alignment on processed film; label verification films and record procedure on patient's chart.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Review radiation therapy treatment plan.
3. Greet patient, verify patient's identification and explain procedure.
4. Assist patient onto treatment table and position the patient.
5. Bare patient's treatment area and verify treatment marks.

PERFORMANCE GUIDE: (cont.)

6. Insert treatment block into treatment machine and use the light system crosshairs to center overhead x-ray tube in the center of the area of interest.
7. Measure the thickness of the patient in the directions in which the central x-ray beam will pass.
8. Set kVp, mA and time appropriate for automatic exposure.
9. Place loaded film cassette in cassette tunnel and center to area of interest for AP projection.
10. Determine target-to-film distance (TFD) and collimate to area of interest including markers.
11. Clear area and make AP verification films from behind lead barrier or control booth.
12. Reposition machine and make lateral verification films.
13. Process x-ray film.
14. Place processed film on view box and verify alignment.

    NOTE: If treatment area and treatment machine are not in exact alignment, repeat steps 6 - 14 until verification films show exact alignment.
15. Label verification films with patient identification information.
16. Record procedure on patient's chart.

CHECKLIST

DUTY Performing Therapeutic Procedures

TASK Conduct radiation therapy portal/verification films.

ENABLER

1. Recall purpose of radiation therapy portal films.
2. Locate treatment blocks needed for portal verification.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct radiation therapy portal/verification films.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's/oncologist's request.		
2.	Reviewed radiation therapy treatment plan.		
3.	Greeted patient, verified patient's identification and explained procedure.		
4.	Assisted patient onto treatment table and positioned the patient.		
5.	Bared patient's treatment area and verified treatment marks.		
6.	Inserted treatment block into treatment machine and used the light system crosshairs to center overhead x-ray tube in the center of the area of interest.		
7.	Measured the thickness of the patient in the directions in which the central x-ray beam would pass.		
8.	Set kVp, mA and time appropriate for automatic exposure.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Placed loaded film cassette in cassette tunnel and centered to area of interest for AP projection.	________	________
10. Determined target-to-film distance (TFD) and collimated to area of interest including markers.	________	________
11. Cleared area and made AP verification films from behind lead barrier or control booth.	________	________
12. Repositioned machine and made lateral verification films.	________	________
13. Processed x-ray film.	________	________
14. Placed processed film on view box and verified alignment.	________	________
15. Labeled verification films with patient identification information.	________	________
16. Recorded procedure on patient's chart.	________	________

DUTY: PERFORMING TESTING/THERAPEUTIC PROCEDURES

PERFORMANCE OBJECTIVE NO. 214

TASK: Verify correct treatment area from portal films.

STANDARD OF PERFORMANCE OF TASK:

Verification portal films must match exactly with simulation radiographs of treatment alignment.

SOURCE OF STANDARD:

Writing team of incumbent workers.
Tasks in Radiation Therapy and Diagnostic Ultrasound Report #9.

CONDITIONS FOR PERFORMANCE OF TASK:

View box
Patient's chart
Verification portal films
Physician's/oncologist's request
Radiation therapy treatment plan
Simulation treatment radiographs

ENABLING OBJECTIVES:

1. Recall purpose of portal films.
2. Recall what a simulation radiography is.
3. Review established department policy/procedure for verifying correct treatment area from portal films.

***RESOURCES:**

1. Department policy/procedure manual.
2. Casciato, D., & Lowitz, B. (1987). Manual of bedside oncology (2nd ed.). Boston, MA: Little, Brown and Company.
3. Hendee, W. (1981). Radiation therapy physics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
4. Moss, W., & Cox, J. (1987). Radiation oncology: Rationale, technique results (6th ed.). St. Louis, MO: C.V. Mosby Company.
5. Verification portal films.
6. Simulation treatment radiograph.
7. Physician's/oncologist's request.

***RESOURCES: (cont.)**

8. Radiation therapy treatment plan.
9. View box.
10. Patient's chart.
11. Checklist - Verifying correct treatment area from portal films.

TEACHING ACTIVITIES:

1. Instruct students on methods for obtaining simulation radiographs and portal verification radiographs. (* 1,5 & 6)
2. Explain and show students how to place radiographs on view box and compare simulation radiographs and portal verification radiographs. (* 1,3,5,6 & 9)
3. Discuss and demonstrate procedure to make adjustments and retake portal verification films if radiographs do not match exactly. (* 2,3,4,5,7 & 8)
4. Explain and show students how to record verification procedure on patient's chart and treatment plan. (* 8 & 10)
5. Monitor students as they practice verifying correct treatment area from portal films. (* 5,6,7,8,9 & 10)
6. Supervise and evaluate students verifying correct treatment area from portal films. (* 11)

CRITERION-REFERENCED MEASURE:

The student must verify physician's/onocologist's request/treatment plan, place simulation treatment radiographs and portal verification radiographs on viewbox, verify treatment areas on radiographs and record verification on patient's chart.

PERFORMANCE GUIDE:

1. Verify physician's/oncologist's request.
2. Obtain simulation radiographs and verify identification.
3. Obtain portal verification radiographs.
4. Place radiographs on view box and compare.
   NOTE: If portal verification radiographs do not exactly match the simulation radiographs, make adjustments and retake portal verification films.
5. Record verification procedure on patient's chart.

CHECKLIST

DUTY Performing Testing/Therapeutic Procedures

TASK Verify correct treatment area from portal films.

ENABLER

1. Recall purpose of portal films.
2. Recall what a simulation radiograph is.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to verify correct treatment area from portal films.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's/oncologist's request.	______	______
2.	Obtained simulation radiographs and verified identification.	______	______
3.	Obtained portal verification radiographs.	______	______
4.	Placed radiographs on view box and compared.	______	______
5.	Retook portal verification films if first radiographs did not exactly match.	______	______
6.	Recorded verification procedure on patient's chart.	______	______

PERFORMANCE OBJECTIVE NO. 215

TASK: Perform wipe-test of work area.

STANDARD OF PERFORMANCE OF TASK:

The test must detect those areas in which the radioactivity present is greater than three times the background radiation level or where there are greater than 100 disintegrations per minute per cm2.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS OF TASK:

Labels
Recording forms
Work area to be tested
Test tubes or planchettes
Radiation counting device
Filter paper or cotton swabs

ENABLING OBJECTIVES:

1. Identify radiation work areas.
2. Review established department protocol for performing wipe test.

***RESOURCES:**

1. Department policy/procedures manual.
2. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
3. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.

***RESOURCES:** (cont.)

5. Ritenour, R., & Hendee, W. (1983). Radiation protection and biology (lesson 1-5). St. Louis, MO: C.V. Mosby Company.
6. Wipe test procedures list.
7. Checklist - Wipe test radiation area.

TEACHING ACTIVITIES:

1. Discuss types of radiation detection devices. (* 2,3,4 & 5)
2. Discuss safety procedures for performing radiation wipe tests. (* 2,3,4 & 6)
3. Present lecture on radiation wipe test procedure. (* 2,3,4 & 6)
4. Conduct class discussion on background radiation measurement. (* 2,3,4, & 5)
5. Demonstrate procedure for wipe test of radiation work area. (* 1,2 & 3)
6. Demonstrate tube preparation and labeling technique. (*1 & 6)
7. Demonstrate how to calculate wipe test results. (* 2,3 & 6)
8. Demonstrate how to record wipe test results. (* 6)
9. Monitor students practicing wipe test procedure.
10. Assign students to wipe test a radiation work area. (* 7)

CRITERION-REFERENCED MEASURE:

The student must prepare and label test tubes, swab area, calculate wipe test results and record test results findings according to department protocol.

PERFORMANCE GUIDE:

1. Assemble test tubes or planchettes.
2. Don gloves.
3. Wipe work area to be tested with moderate pressure using piece of filter paper or cotton swab.
4. Repeat several times around area, each time with fresh cotton swab or piece of filter paper.
5. Place each paper or swab in test tube or on planchette.
6. Label each tube or planchette as to area tested.
7. Measure radioactivity of each tube or planchette using appropriate radiation detection instrument, determining instrument efficiency if disintegrations per minute are being counted.

PERFORMANCE GUIDE: (cont.)

8. Measure radioactivity of "blank" tube or planchette to determine background radiation level, if contamination relative to background is being compared.
9. Compute/observe level of contamination.
   NOTE: Readings ≥ 100 disintegrations per minute per cm2 or three times background level indicate contamination.
10. Record readings on recording form.

CHECKLIST

DUTY Practicing Radiation Safety

TASK Perform wipe-test of work area.

ENABLER

1. Identify radiation work area.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's performance when performing wipe test of work area.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Assembled test tubes or planchettes.	______	______
2. Donned gloves prior to beginning wipe test.	______	______
3. Wiped work area prior to beginning wipe test.	______	______
4. Repeated several times around area, each time with fresh cotton swab or piece of filter paper.	______	______
5. Placed each paper or swab in test tube or on planchette.	______	______
6. Labeled each tube or planchette as to area tested.	______	______
7. Measured radioactivity of each tube or planchette using appropriate radiation detection instrument, determining instrument efficiency if disintegrations per minute were being counted.	______	______
8. Measured radioactivity of "blank" tube or planchette to determine background radiation level, if contamination relative to background was being compared.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
9. Computed/observed level of contamination.	________	________
10. Recorded readings on recording form.	________	________

DUTY: PRACTICING RADIATION SAFETY

PERFORMANCE OBJECTIVE NO. 216

TASK: Replace Xenon trap cartridges.

STANDARD OF PERFORMANCE OF TASK:

Installation and inspection must ensure 100% trapping to prevent escape/exposure. Radiation exposure from Xenon gas to patients and personnel must remain as low as reasonably achievable, according to ALARA standards.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Plastic bag
Replacement cartridges
Area for storing radioactive waste
Xenon trap with a manufacturer's indicator of spent cartridges

ENABLING OBJECTIVES:

1. Identify manufacturer's suggested cartridge replacement procedure.
2. Establish Xenon trap cartridge location.
3. Review department policy/procedure for replacing Xenon trap cartridge.

***RESOURCES:**

1. Department policy/procedure manual.
2. Manufacturer's instruction manual.
3. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
4. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
5. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
6. Xenon trap cartridge.
7. Checklist - Replacing Xenon trap cartridge.

TEACHING ACTIVITIES:

1. Present lecture on Xenon trap cartridge location and function. (* 2,3,4,5 & 6)
2. Discuss methods for determining when the Xenon cartridge should be replaced. (* 2,3,4 & 5)
3. Conduct class discussion on types of detection devices and safety precautions for replacing Xenon trap cartridge.
4. Explain removal procedure for Xenon trap cartridge. (* 2,3 & 4)
5. Demonstrate Xenon trap cartridge removal procedure. (* 2)
6. Demonstrate disposal procedure for contaminated materials. (* 1,3,4 & 5)
7. Discuss procedure and location for storing radiation contaminated materials. (* 1,3,4 & 5)
8. Demonstrate Xenon trap cartridge installation procedure. (* 2)
9. Conduct class discussion on the importance of proper installation of new cartridge and disposal of old cartridge. (* 1,3,4 & 5)
10. Monitor students practicing replacing a Xenon trap cartridge.
11. Assign student to replace a Xenon trap cartridge. (* 7)

CRITERION-REFERENCED MEASURE:

The student must remove the Xenon trap cartridge, dispose of old cartridge in plastic bag, store the bagged cartridge in accordance with Nuclear Regulatory Commission guidelines, and install a new Xenon trap cartridge according to manufacturer's instructions/department protocol.

PERFORMANCE GUIDE:

1. Determine when cartridges should be replaced, using nomogram or other indicator provided by the manufacturer.
2. Lift out old cartridge pack as per manufacturer's instructions.
3. Dispose of old pack in plastic bag.
4. Store in radioactive waste container until it has decayed to background radiation level.
5. Insert replacement cartridge pack following manufacturer's instructions.

CHECKLIST

DUTY Practicing Radiation Safety

TASK Replace Xenon trap cartridges.

ENABLER

1. Identify manufacturer's suggested cartridge replacement procedure.
2. Establish Xenon trap cartridge location.

STUDENT'S NAME ____________________ **DATE** ________

EVALUATOR'S NAME ____________________ **COURSE** ________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to replace Xenon trap cartridges.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Determined when cartridges should be replaced, using nomogram or other indicator provided by the manufacturer.		
2. Lifted out old cartridge pack as per manufacturer's instruction.		
3. Disposed of old pack in plastic bag.		
4. Stored in radioactive waste container until it had decayed to background radiation level.		
5. Inserted replacement cartridge pack following manufacturer's instructions.		

DUTY: PRACTICING RADIATION SAFETY

PERFORMANCE OBJECTIVE NO. 217

TASK: Perform radiation work area survey.

STANDARD OF PERFORMANCE OF TASK:

Radiation work area must contain less than the maximum acceptable radiation dose levels, according to federal, state, and ALARA standards. Detection and reporting of radiation contamination to Radiation Safety Officer must occur immediately.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Survey form
Survey instrument
Maximum acceptable dose levels

ENABLING OBJECTIVES:

1. Identify radiation work areas.
2. Determine type of radiation to which the work area is exposed.
3. Review established department protocol for radiation contamination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Statkiewicz, M. and Ritneour, R. (1983). Radiation protection for student radiographers. St. Louis, MO: C.V. Mosby Company.
3. Stevens, M. and Phillips, R. (1983). Comprehensive review for the radiologic technologist. St. Louis, MO: C.V. Mosby Company.
4. Ballinger, P. (1985). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
5. Bernier, D., Langan, K., and Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

6. Early, P. and Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
7. Radiation detection/survey instruments.
8. Checklist - Detect radiation in work area.

TEACHING ACTIVITIES:

1. Discuss the need for radiation monitoring of the work areas. (* 2,4,5,6 & 7)
2. Present a lecture on the type of area radiation detection instruments. (* 2,4,5,6 & 7)
3. Discuss ionization chamber-type survey meter (cutie pie) and the type of radiation it detects. (* 2,5 & 6)
4. Discuss proportional counters and the types of radiation they detect. (* 2,4,5 & 6)
5. Discuss the Geiger-Mueller type dose rate survey equipment (G-M) Detector. (* 2,4,5 & 6)
6. Discuss scintillation detectors for radiation detection and the types of radiation they detect. (* 2,4,5 & 6)
7. Present lecture on work area survey/monitoring procedures. (* 1,2,3,4,5 & 6)
8. Discuss posting of radiation warning signs. (* 2 & 4)
9. Discuss methods for decontaminating a work area. (* 2,4,5 & 6)
10. Demonstrate how to survey a work area using the different types of radiation detection devices. (* 2,4,5 & 6)
11. Demonstrate how to read the radiation measurement recorded by the detector. (* 2,4,5 & 6)
12. Discuss radiation measurement and reading tolerances. (* 2,4,5 & 6)
13. Conduct class discussion on the seriousness of different levels of radiation.
14. Monitor students while they practice using radiation survey instruments.
15. Discuss decontamination procedures for both work area and personnel. (* 2,4,5 & 6)
16. Demonstrate decontamination procedures. (* 2,4,5 & 6)
17. Monitor students while they practice decontamination procedures.
18. Conduct class discussion on whom to contact in case of radiation contamination.
19. Assign student to perform a radiation work area survey.(* 8)

CRITERION-REFERENCED MEASURE:

The student must survey the work area for radiation exposure, read the radiation measurement and determine if the area is contaminated.

PERFORMANCE GUIDE:

1. Identify areas to be surveyed.
2. Turn survey instrument on.
3. Verify recent calibration.
4. Survey designated areas.
5. Record reading and location of reading at each position.
6. Convert readings to estimated dose equivalents.
7. Compare dose equivalents to maximum acceptable dose levels (MPD).
8. Decontaminate area if reading at any position is above MPD.
9. Notify Radiation Safety Officer.

CHECKLIST

DUTY Practicing Radiation Safety

TASK Perform radiation work area survey.

ENABLER

1. Identify radiation work areas.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate student's performance when surveying a radiation work area.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Identified area to be surveyed.	______	______
2.	Assembled radiation detection equipment.	______	______
3.	Turned on radiation survey equipment.	______	______
4.	Calibrated survey equipment.	______	______
5.	Surveyed designated work areas.	______	______
6.	Recorded location and instrument readings at each location.	______	______
7.	Compared instrument reading/measurement to maximum permissible dose levels.	______	______
8.	Established if work area was contaminated and decontaminated area.	______	______
9.	Reported radiation contamination to Radiation Safety Officer.	______	______

DUTY: PRACTICING RADIATION SAFETY

PERFORMANCE OBJECTIVE NO. 218

TASK: Receive radionuclides shipment.

STANDARD OF PERFORMANCE OF TASK:

The shipment receipt number and measurements must be recorded. The Radiation Safety Office (RSO) must be immediately notified if the shipment is contaminated or shipping/packing defects are noted.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Gloves
Wipe-test materials
Shipment receipt forms
Shipment of radionuclides
Radiation monitoring device
Trash and radioactive waste disposal facilities

ENABLING OBJECTIVES:

1. Identify type of radionuclides being received.
2. Establish protocol for transporting radionuclides with the institution.
3. Review department protocol for receiving radionuclides.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

5. Ritenour, R., & Hendee, W. (1983). Radiation protection and biology (lesson 1-5). St. Louis, MO: C.V. Mosby Company.
6. Statkiewicz, M., & Ritneour, R. (1983). Radiation protection for student radiographers. St. Louis, MO: C.V. Mosby Company.
7. Radioactive shipment receipt form.
8. Radioactive level labels.
9. Checklist - Receiving a radionuclide shipment.

TEACHING ACTIVITIES:

1. Present lecture on stages of inspecting radionuclide shipments. (* 1,2,3,4,5 & 6)
2. Identify types of shipping packages and containers used for radionuclides and DOT diamond-shaped RADIOACTIVE labels. (* 2 & 3)
3. Instruct students to list types of damage they would look for when visually inspecting a radionuclide shipment.
4. Discuss inspection points, types of damage and methods of shipping radionuclides. (* 2 & 3)
5. Demonstrate procedure for performing a Stage I External (visual) inspection of the radionuclide package. (* 1,2,3,5 & 6)
6. Stress notification procedure/course of action for signs of external damage. (* 1,2 & 3)
7. List types of radiation monitoring devices and explain their uses. (* 2,3,4,5 & 6)
8. Present activity ranges for different types of radionuclides and where they are found on the DOT RADIOACTIVE labels. (* 2,3,5,6 & 8)
9. Explain what surface exposure is and how it is measured. (* 2,3,4,5 & 6)
10. Demonstrate procedure for performing a Stage II-Internal prior to opening inspection of the radionuclide shipment. (* 1,2 & 3)
11. Show forms used to record monitoring device reading associated with activity levels. (* 1,2 & 3)
12. Demonstrate procedure for recording Stage II inspection findings per department protocol. (* 1,2 & 3)
13. Stress notification procedures/course of action for readings above acceptable activity levels. (* 1,2 & 3)
14. Review safety precautions to be followed prior to opening package. (* 1,2,3,4,5 & 6)
15. Stress the importance of visually inspecting the radionuclide container prior to removal from packing container. (* 2 & 3)

TEACHING ACTIVITIES: (cont.)

16. Demonstrate procedure for content/quantity verification utilizing the packaging slip.
17. Demonstrate procedure for performing wipe test on the radionuclide container. (* 1,2,3 & 5)
18. Demonstrate procedure for calculating and recording wipe test results and units of activity. (* 1,2,3 & 5)
19. Stress notification/course of action for activity above acceptable levels. (* 1,2 & 3)
20. Discuss information contained in the radioactive shipment receipt report. (* 2 & 3)
21. Demonstrate procedure for completing the radioactive shipment receipt report. (* 1,2,3 & 7)
22. Discuss and demonstrate handling and disposal of radionuclide shipment packing materials. (* 1,2,3,4,5 & 6)
23. Monitor students practicing receipt of a radionuclide shipment.
24. Assign student to receive a radionuclide shipment. (* 9)

CRITERION-REFERENCED MEASURE:

The student must perform a Stage I - External (visual) inspection of the shipment, a Stage II - Internal prior to opening inspection, open the package, perform a visual inspection of the radionuclide container, wipe test the container, verify the contents of the shipment, document findings or contact appropriate regulating agency, complete radioactive shipment receipt report and dispose of shipment packing material in accordance with department protocol and Nuclear Regulatory Commission guidelines.

PERFORMANCE GUIDE:

1. Visually inspect package for signs of damage, such as wetness or crushed appearance, notifying Radiation Safety Officer (RSO), if damage is visible.
2. Measure exposure rate at three feet from package surface, notifying RSO if readings of 10 mr/hr or greater are obtained.
3. Record readings.
4. Measure surface exposure rate, notifying RSO if readings of 200 mr/hr or greater are obtained.
5. Record readings.
6. Don gloves.

PERFORMANCE GUIDE: (cont.)

7. Open outer package.
8. Remove packing slip.
9. Open inner package to verify contents against packing slip.
10. Check integrity of final source container, notifying RSO if damage is visible.
11. Wipe test external surface of final source container if:
    I 131 is greater than 100 mCi
    Tc99m is greater than 100 mCi (generators are specifically exempt)
    I 125, C14, H3, or S35 is greater than 10 mCi
    Se75 or Yb169 if greater than 1 mCi
12. Record results of the wipe test.
13. Log receipt of radionuclide shipment on shipment receipt forms.
14. Monitor packing material before discarding.
15. Treat as radioactive waste if contaminated.
16. Obliterate radiation labels before discarding in regular trash if not contaminated.

CHECKLIST

DUTY Practicing Radiation Safety

TASK Receive radionuclides shipment.

ENABLER

1. Identify type of radionuclides being received.

STUDENT'S NAME____________________ **DATE**________

EVALUATOR'S NAME____________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to receive radionuclides shipment.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Inspected package visually for signs of damage, such as wetness or crushed appearance, notified Radiation Safety Officer (RSO) if damage was visible.	______	______
2.	Measured exposure rate at three feet from package surface, notifying RSO if readings of 10 mr/hr or greater were obtained.	______	______
3.	Recorded readings.	______	______
4.	Measured surface exposure rate, notifying RSO if readings of 200 mr/hr or greater were obtained.	______	______
5.	Recorded readings.	______	______
6.	Donned gloves.	______	______
7.	Opened outer package.	______	______
8.	Removed packing slip.	______	______
9.	Opened inner package to verify contents against packing slip.	______	______
10.	Checked integrity of final source container, notifying RSO if damage was visible.	______	______

PERFORMANCE DETERMINANTS (cont.)	YES	NO
11. Wipe tested external surface of final source container if: I 131 is greater than 100 mCi; 99m was greater than 100 mCi (generators are specifically exempt); I 125, C14, H3, or S35 was greater than 10 mCi; Se75 or Yb169 if greater than 1 mCi.		
12. Recorded results of the wipe test.		
13. Logged receipt of radionuclide shipment on shipment receipt forms.		
14. Monitored packing material before discarding.		
15. Treated as radioactive waste if contaminated.		
16. Obliterated radiation labels before discarding in regular trash if not contaminated.		

DUTY: PRACTICING RADIATION SAFETY

PERFORMANCE OBJECTIVE NO. 219

TASK: Decontaminate radiation work area.

STANDARD OF PERFORMANCE OF TASK:

The level of radioactivity level must be less than three times the background level or less than 100 disintegrations per minute per cm2. Levels must comply with the standards as established by state/federal regulations.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Contaminated area
Decontamination kit
Radiation warning signs

ENABLING OBJECTIVES:

1. Identify type of radiation contamination.
2. Review established department protocol for handling radiation contamination.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ritenour, R., & Hendee, W. (1983). Radiation protection and biology (lesson 1-5). St. Louis, MO: C.V. Mosby Company.
5. Statkiewicz, M., & Ritneour, R. (1983). Radiation protection for student radiographers. St. Louis, MO: C.V. Mosby Company.
6. Decontamination kit.
7. Radiation warning signs.
8. Checklist - Decontaminating radiation work area.

TEACHING ACTIVITIES:

1. Discuss methods used to enclose contaminated area. (* 1,2 & 3)
2. Show procedure to secure the area from spread of further contamination. (* 1,2 & 3)
3. Examine types of radiation signs and discuss their usage. (* 2,3,4 & 5)
4. Conduct class discussion on type of radioactive materials. (* 2,3,4 & 5)
5. Stress posting warning signs to prevent entry of unauthorized personnel. (* 2,3 & 7)
6. Explain methods for radioactive spill confinement. (* 1,2,3,4 & 5)
7. Examine contents of a decontamination kit. (* 1,2,3,4,5 & 6)
8. Stress safety precautions for cleaning up radiation spills.
9. Demonstrate procedure for cleaning up spills. (* 1,2 & 3)
10. Discuss monitoring the area and personnel for radiation exposure. (* 2,3,4 & 5)
11. Demonstrate radiation exposure monitoring techniques. (* 2,3,4 & 5)
12. Discuss disposal/storage of contaminated articles. (* 1,2,3,4 & 5)
13. Demonstrate procedure for disposing/storing contaminated articles in accordance with the Nuclear Regulatory Commission and department protocol. (* 1,2,3,4 & 5)
14. Explain records/reports which are required to be completed and filed. (* 1,2 & 3)
15. Demonstrate procedure for completing radiation contamination records/reports required. (* 1,2 & 3)
16. Monitor students while they practice decontaminating a radiation work area.
17. Instruct student to decontaminate a radiation work area. (* 8)

CRITERION-REFERENCED MEASURE:

The student must secure the contaminated area, notify appropriate authorities, post radiation warning signs, confine the spill, clean up the spill, decontaminate the area, monitor work area and personnel radiation exposure, dispose/store contaminated articles, complete contamination records and file contamination reports in accordance with the Nuclear Regulatory Commission and department protocol.

PERFORMANCE GUIDE:

1. Block access to area.
2. Notify immediate supervisor/RSO and state and/or federal agencies as required.
3. Post warning signs, noting radionuclide.
4. Confine spill, if possible.
5. Remove contamination, wearing gloves.
6. Clean area using decontamination kit.
7. Monitor area and personnel.
8. Repeat cleaning procedure until levels of radiation activity are acceptable.
9. Store and dispose of contaminated material, following regulations as established by state/federal regulations.
10. Record activities associated with spill and clean-up.

CHECKLIST

DUTY Practicing Radiation Safety

TASK Decontaminate radiation work area.

ENABLER

1. Identify available methods for radioactive waste disposal.

STUDENT'S NAME ______________________ **DATE** __________

EVALUATOR'S NAME ______________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to decontaminate radiation work area.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Blocked access to area.	______	______
2.	Notified immediate supervisor/RSO and state and/or federal agencies as required.	______	______
3.	Posted warning signs, noting radionuclide.	______	______
4.	Confined spill, if possible.	______	______
5.	Removed contamination wearing gloves.	______	______
6.	Cleaned area using decontamination kit.	______	______
7.	Monitored area and personnel.	______	______
8.	Repeated cleaning procedure until levels of radiation activity were acceptable.	______	______
9.	Stored and disposed of contaminated material, following regulations as established by state/federal regulations.	______	______
10.	Recorded activities associated with spill and clean-up.	______	______

DUTY: PRACTICING RADIATION SAFETY

PERFORMANCE OBJECTIVE NO. 220

TASK: Dispose of radioactive waste.

STANDARD OF PERFORMANCE OF TASK:

Waste must be disposed of in a manner that complies with the given licensing agreement and is approved by the Nuclear Regulatory Commission and local/state/federal established guidelines.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Disposal recording forms
Radioactive waste material
Approved methods of disposal
Disposal unit for the radioactive waste

ENABLING OBJECTIVES:

1. Identify available methods for radioactive waste disposal.
2. Identify radioactive waste disposal containment units/sites available.
3. Review department protocol for disposing of radioactive wastes.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ritenour, R., & Hendee, W. (1983). Radiation protection and biology (lesson 1-5). St. Louis, MO: C.V. Mosby Company.
5. Statkiewicz, M., & Ritneour, R. (1983). Radiation protection for student radiographers. St. Louis, MO: C.V. Mosby Company.

*RESOURCES: (cont.)

6. Nuclear Regulatory Commission guidelines for radioactive waste disposal.
7. Department of Transportation radioactive waste disposal guidelines.
8. Checklist - Disposing of radioactive waste.

TEACHING ACTIVITIES:

1. Conduct class discussion on types of contaminated materials which must be disposed of and methods of disposal. (* 1,2,3,4,5 & 6)
2. Explain rules and regulations governing disposal procedures and sites. (* 2,3 & 6)
3. Discuss background radiation levels and how to measure them. (* 2,3,4 & 5)
4. Demonstrate survey equipment usage to determine radiation background activity when inspecting disposal materials for shipping. (* 2,3,4 & 5)
5. Stress the usage of approved containers, protective shields and barriers when hauling or shipping radioactive waste for disposal. (* 2 & 3)
6. Discuss Department of Transportation's and Nuclear Regulatory Commission's rules and regulations for packaging, labeling and shipping radioactive waste. (* 6 & 7)
7. Demonstrate radioactive waste packing and labeling procedure. (* 2,3,6 & 7)
8. Explain records and shipping documents which must be completed and filed for radioactive materials disposal. (* 1,2,3,6 & 7)
9. Demonstrate methods for completing and filing radioactive waste disposal records and documents. (* 1,2,3,6 & 7)
10. Monitor students while they practice disposal of radioactive waste.
11. Assign student to dispose of radioactive waste. (* 8)

CRITERION-REFERENCED MEASURE:

The student must identify the type of radioactive waste, determine the method of disposal, package the waste, label the packaged waste, and complete records documenting the activity level, amount of waste and method of disposal in accordance with the Department of Transportation's and Nuclear Regulatory Commission's regulations and guidelines.

PERFORMANCE GUIDE:

1. Determine type, quantity, and activity of waste material for disposal.
2. Choose most appropriate method for disposal: decay in storage, sewer dilution, incineration, burial, venting of gases, or transfer to authorized recipient.
3. Remove radioactive waste material from work area to disposal site.
4. Complete radioactive waste disposal forms providing all information.

   NOTE: Records must be maintained until disposal is approved by Nuclear Regulatory Commission. Disposal must be in accordance with state/local/federal regulatory agencies.

CHECKLIST

DUTY Practing radiation safety

TASK Dispose of radioactive waste.

ENABLER

1. Identify available methods for radioactive waste disposal.
2. Identify radioactive waste disposal containment units/sites available.

STUDENT'S NAME ______________________ **DATE** ________

EVALUATOR'S NAME ______________________ **COURSE** ________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to identify available methods for radioactive waste disposal.

PERFORMANCE DETERMINANTS	YES	NO
1. Determined type, quantity, and activity of waste material for disposal.	______	______
2. Selected most appropriate method for disposal: decay in storage, sewer dilution, incineration, burial, venting of gases, or transfer to authorized recipient.	______	______
3. Removed radioactive waste material from work area to disposal site.	______	______
4. Completed radioactive waste disposal forms providing all information.	______	______

DUTY: PRACTICING RADIATION SAFETY

PERFORMANCE OBJECTIVE NO. 221

TASK: Perform calibration tests on radiation survey instruments.

STANDARD OF PERFORMANCE OF TASK:

Calibration checks must be performed, after servicing and annually. The exposure rate must be within + or - 10% of the true exposure rate. Reference checks must be performed before and after each survey, after servicing and as indicated by local, state or federal guidelines. The observed readings must be within + or - 20% of the calibrated reading.

SOURCE OF STANDARD:

Writing team of incumbent workers.
V-TECS Nuclear Medicine Catalog.

CONDITIONS FOR PERFORMANCE OF TASK:

Record forms
Quality control log
Radiation survey instrument
Radionuclide reference standard
Calibrated radionuclide standard
Manufacturer's calibration procedure

ENABLING OBJECTIVES:

1. Identify reference source/standard to be used for calibration.
2. Review established department protocol for calibrating radiation survey intstruments.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

4. Cusworth, R. (1983). Quality assurance in diagnostic radiology: An eight-step methodology (lesson 1-3). St. Louis, MO: C.V. Mosby Company.
5. Ritenour, R., & Hendee, W. (1983). Radiation protection and biology (lesson 1-5). St. Louis, MO: C.V. Mosby Company.
6. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.
7. Reference source/standard.
8. Radiation survey instrument.
9. Calibration record form.
10. Checklist - Calibrating radiation survey instrument.

TEACHING ACTIVITIES:

1. Identify types of pre-calibrated sources used to calibrate radiation survey instruments. (* 1,2,3,4 & 7)
2. Show students examples of pre-calibrated reference sources. (* 7)
3. Review how to operate the radiation survey instrument. (* 1 & 8)
4. Discuss positioning of the source including geometry and distance from survey instrument. (* 1,2 & 3)
5. Review the different scales on the survey instrument and how to adjust the instrument to the prescribed source intensity. (* 8)
6. Demonstrate how to adjust the survey instrument intensity by 1/3 and 2/3. (* 8)
7. Stress the danger of improper calibration to patients and personnel.
8. Show students the survey instrument calibration form. (* 9)
9. Discuss the information included on the calibration form. (* 9)
10. Demonstrate procedure for completing a calibration form. (* 1,2,3 & 9)
11. Explain what a quarterly reference check is and its purpose. (* 1)
12. List types of long-lived reference standards. (* 2 & 7)
13. Conduct a class discussion on the meaning of long exposure readings. (* 2,3 & 5)
14. Review procedure for conducting a quarterly reference check. (* 1)
15. Demonstrate quarterly reference check calibration procedures. (* 1,2 & 3)

TEACHING ACTIVITIES: (cont.)

16. Explain how to interpret/analyze quarterly reference check results. (* 6)
17. Review calibration records and how to complete them. (* 9)
18. Stress notification procedures and action to be taken for unacceptable calibration results. (* 1)
19. Monitor students practicing calibration of a radiation survey instrument. (* 7,8 & 9)
20. Assign student to calibrate a radiation survey instrument. (* 10)

CRITERION-REFERENCED MEASURE:

The student must identify the type of pre-calibrated reference source needed, determine the positioning of the reference source, calibrate the survey instrument according to the intensity of the reference source, analyze the readings, record the calibration results on a calibration form and notify appropriate personnel of findings.

PERFORMANCE GUIDE:

1. Position pre-calibrated source at specified distance and geometry.
2. Adjust instrument reading to known intensity of calibrated source.
3. Repeat calibration for each scale at 1/3 and 2/3 scale.
4. Record results.
5. Measure/log exposure rate of long-lived reference standard at specified distance and geometry.

   Reference Check (Quarterly):
6. Place long-lived standard at specified geometry.
7. Measure/log exposure readings.
8. Compare readings with those taken at calibration.
9. Repeat procedure if results are outside established limits.
10. Notify supervisor/manufacturer if results remain outside limits.

CHECKLIST

DUTY Practicing Radiation Safety

TASK Perform calibration tests on radiation survey instruments.

ENABLER

1. Identify reference source/standard to be used for calibration.

STUDENT'S NAME________________ **DATE**__________

EVALUATOR'S NAME________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to perform calibration tests on radiation survey instruments.

	PERFORMANCE DETERMINANTS	**YES**	**NO**
1.	Positioned pre-calibrated source at specified distance and geometry.		
2.	Adjusted instrument reading to known intensity of calibrated source.		
3.	Repeated calibration for each scale at 1/3 and 2/3 scale.		
4.	Recorded results.		
5.	Measured/logged exposure rate of long-lived reference standard at specified distance and geometry.		
	Reference Check (Quarterly):		
6.	Placed long-lived standard at specified geometry.		
7.	Measured/logged exposure readings.		
8.	Compared readings with those taken at calibration.		

	PERFORMANCE DETERMINANTS (cont.)	YES	NO
9.	Repeated procedure if results were outside established limits.	________	________
10.	Notified supervisor/manufacturer if results remained outside limits.	________	________

DUTY: PRACTICING RADIATION TREATMENT

PERFORMANCE OBJECTIVE NO. 222

TASK: Post radiation signs on patient bed, room, and danger zones.

STANDARD OF PERFORMANCE OF TASK:

Radiation warning/hazard signs must be posted wherever the threat of radiation exposure to the general public, patients or hospital staff exists. Radiation exposure to all humans must be within the ALARA standards. The location, time, and type of sign must be recorded in the radiation safety log.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Tool kit
Radiation hazard site
Radiation hazard signs

ENABLING OBJECTIVES:

1. Recall types of radiation threats.
2. Identify and assemble radiation warning/hazard signs.
3. Identify locations for posting radiation warning/hazard signs.
4. Review established department policy/procedure for posting radiation signs on patient's bed, room and danger zones.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.

***RESOURCES:** (cont.)

5. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.
6. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.
7. Statkiewicz, M., & Ritneour, R. (1983). Radiation protection for student radiographers. St. Louis, MO: C.V. Mosby Company.
8. Gill, F., & Ashton, I. (1982). Monitoring for health hazards at work. Boston, MA: Blackwell Scientific Publications Ltd.
9. Riegelman, R. (1987). Putting prevention into practice. Boston, MA: Little, Brown and Company.
10. Casciato, D., & Lowitz, B. (1987). Manual of bedside oncology (2nd ed.). Boston, MA: Little, Brown and Company.
11. Radiation warning/hazard signs.
12. Radiation hazard site.
13. Radiation safety log.
14. Checklist - Posting radiation signs at danger zones.

TEACHING ACTIVITIES:

1. Conduct class discussion on possible radiation hazard sites. (* 1,2,3,4,5 & 6)
2. Instruct students to determine if radiation danger is temporary or permanent. (* 2,3,7,8,9 & 10)
3. Explain and show students how to establish radiation hazard level. (* 2,3,5,7 & 8)
4. Explain and demonstrate how to post radiation warning/hazard signs according to degree and existence of radiation contamination possibilities to humans. (* 7,8,9,11 & 12)
5. Review procedure to record location, time, date, and type of sign posted in the radiation safety log. (* 1,2,3,5,7 & 13)
6. Monitor students as they practice posting radiation signs. (* 11,12 & 13)
7. Supervise and evaluate students posting radiation signs. (* 14)

CRITERION-REFERENCED MEASURE:

The student must identify the type of radiation hazard, assemble radiation warning/hazard signs, post the sign at the danger site, and record posting information in radiation safety log.

PERFORMANCE GUIDE:

1. Obtain radiation hazard signs.
2. Determine radiation hazard site:
    - A. Radionuclide storage area.
    - B. Radiation emitting equipment.
    - C. Nuclear medicine lab.
    - D. Nuclear medicine administration site.
    - E. Radiation contamination disposal site.
    - F. Radioactive accident or spill site.
    - G. Radioactive patient by treatment dose.
3. Determine if radiation danger is temporary or permanent.
4. Establish radiation hazard level.
5. Post radiation warning/hazard signs according to degree and existent of radiation contamination possibilities to humans.
6. Record location, time, date, and type of sign posted in the radiation safety log.

CHECKLIST

DUTY Practicing Radiation Treatment

TASK Post radiation signs on patient's bed, room, and danger zones.

ENABLER

1. Recall types of radiation threats.
2. Identify and assemble radiation warning/hazard signs.
3. Identify locations for posting radiation warning/hazard signs.

STUDENT'S NAME ______________________________ **DATE** __________

EVALUATOR'S NAME ____________________________ **COURSE** ________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to post radiation signs on patient, bed, room and danger zones.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained radiation hazard signs.		
2.	Determined radiation hazard site.		
3.	Determined if radiation danger was temporary or permanent.		
4.	Established radiation hazard level.		
5.	Posted radiation warning/hazard signs according to degree and existence of radiation contamination possibilities to humans.		
6.	Recorded location, time, date, and type of sign posted in the radiation safety log.		

DUTY: PRACTICING RADIATION SAFETY

PERFORMANCE OBJECTIVE NO. 223

TASK: Dispose of radioactive contaminated materials.

STANDARD OF PERFORMANCE OF TASK:

Contaminated materials must be disposed of in accordance with state, local and federal regulations, using suitable safety precautions to prevent further contamination in accordance with ALARA standards.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Labels
Survey material
Decontamination kit
Contaminated material
Disposal forms/records
Local/state/federal regulations

ENABLING OBJECTIVES:

1. Identify type of radioactive contaminated material to be disposed.
2. Identify acceptable ways of disposing of radioactive contaminated materials.
3. Review local, state and federal guidelines and procedures for disposing of radioactive materials.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

5. Bushong, S. (1984). Radiologic science for technologists: Physics, biology and protection (3rd ed.). St. Louis, MO: C.V. Mosby Company.
6. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.
7. Ritenour, R., & Hendee, W. (1983). Radiation protection and biology (lesson 1-5). St. Louis, MO: C.V. Mosby Company.
8. Statkiewicz, M., & Ritneour, R. (1983). Radiation protection for student radiographers. St. Louis, MO: C.V. Mosby Company.
9. Local, state and federal guidelines for radioactive material disposal.
10. Guest speaker.
11. Radioactive materials labels.
12. Checklist - Disposing of radioactive materials.

TEACHING ACTIVITIES:

1. Discuss the procedure for segregation of different types of radioactive wastes. (* 2,3,7 & 9)
2. Stress the use of protective clothing and equipment when working with radioactive wastes. (* 1,4 & 6)
3. Explain the methods of disposing of radioactive waste and the types of waste which can be disposed of with each method. (* 2,3,5,7,8 & 9)
4. Discuss disposal by decay, sewer dilution, incineration, burial, venting and transfer. (* 2,3,5,7,8 & 9)
5. Discuss and demonstrate how to measure waste for radioactivity using radiation survey equipment. (* 2,3,5,7,8 & 9)
6. Explain what a disposal site is and the location of approved sites in the area. (* 2,3 & 9)
7. Identify approved containers for storage and transfer of radioactive materials. (* 2,3,5,7,8 & 9)
8. Introduce guest speaker to talk on rules, regulations and procedures for disposing of radioactive wastes. (* 10)
9. Conduct a field trip to a radiation disposal site. (* 10)
10. Demonstrate how to package radioactive materials for transfer to disposal sites. (* 2,3,5,7,8,9 & 11)
11. Explain disposal forms and records which must be filed when disposing of radioactive contaminated materials. (* 1 & 9)

TEACHING ACTIVITIES: (cont.)

12. Instruct student to practice identifying the type of radioactive material, measuring the activity and determining the method of disposal. (* 9 & 11)
13. Assign student to dispose of radioactive contaminated materials. (* 12)

CRITERION-REFERENCED MEASURE:

The student must identify the type of radiation contaminations, measure the level of activity, determine the appropriate means of disposal, dispose of the contaminated material and complete and file documentation of the disposal.

PERFORMANCE GUIDE:

1. Identify contaminated material disposal procedure in accordance with appliable state/local/federal regulations and ALARA standards.
2. Survey contaminated materials until radiation levels reach acceptable levels.
   NOTE: Acceptable levels being background or less if decay is the acceptable means of disposal.
3. Monitor and store contaminated materials in an area suitable to prevent further contamination or exposure to personnel by utilizing protective shielding.
4. Mark/label survey items to be shipped for disposal to ensure that exposure to the contaminates will be kept to a minimum in accordance with ALARA standards.
   NOTE: Labeling must meet DOT, and ALARA government regulations.
5. Complete the necessary documentation to account for the actions taken and annotate disposal method.
   NOTE: Governing rules and regulations vary from state to state.

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CHECKLIST

DUTY Practicing Radiation Safety

TASK Dispose of radioactive contaminated materials.

ENABLER

1. Identify type of radioactive contaminated material to be disposed.
2. Identify acceptable ways of disposing of radioactive contaminated materials.
3. Establish local, state and federal guidelines and procedures for disposing of radioactive materials.

STUDENT'S NAME____________________________ **DATE**________

EVALUATOR'S NAME__________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to dispose of radioactive contaminated materials

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Identified contaminated material disposal procedure in accordance with appliable state/local/federal regulations and ALARA standards.	______	______
2. Surveyed contaminated materials until radiation levels reached acceptable levels.	______	______
3. Monitored and stored contaminated materials in an area suitable to prevent further contamination or exposure to personnel by utilizing protective shielding.	______	______
4. Marked/labeled survey items to be shipped for disposal to ensure that exposure to the contaminates will be kept to a minimum in accordance with ALARA standards.	______	______
5. Completed the necessary documentation to account for the actions taken and annotated disposal method.	______	______

DUTY: PRACTICING RADIATION SAFETY

PERFORMANCE OBJECTIVE NO. 224

TASK: Transport radioactive isotopes within the institution.

STANDARD OF PERFORMANCE OF TASK:

Radioactive isotopes must be transported when requested by physician for administration of a dosage. Transported radioactive isotopes must be encased in an approved protective radioactive transport vehicle/container and established radioactive materials route must be followed.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Radioactive isotope
Radiation transport vehicle
Radiation transport container
Radiation protective shielding
Radioactive isotope storage container
Physician's orders/transportation authorization

ENABLING OBJECTIVES:

1. Identify location radioactive isotope is to be transported to.
2. Locate approved radioactive transport vehicle or container.
3. Establish radioactive materials route to be followed.
4. Recall safety precautions to be followed when transporting radioactive isotopes.
5. Review established department policy/procedure for transporting radioactive isotopes within the institution.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Statkiewicz, M., & Ritneour, R. (1983). Radiation protection for student radiographers. St. Louis, MO: C.V. Mosby Company.
5. Gill, F., & Ashton, I. (1982). Monitoring for health hazards at work. Boston, MA: Blackwell Scientific Publications Ltd.
6. Riegelman, R. (1987). Putting prevention into practice. Boston, MA: Little, Brown and Company.
7. Casciato, D., & Lowitz, B. (1987). Manual of bedside oncology (2nd ed.). Boston, MA: Little, Brown and Company.
8. Radioactive isotope.
9. Radiation transport vehicle/container.
10. Checklist - Transporting radioactive isotopes.

TEACHING ACTIVITIES:

1. Discuss and show students type of transport authorizations, types of isotopes to be transferred, and types of transport containers. (* 2,3,4,5 & 9)
2. Review and discuss radiation handling procedures. (* 2,3,4,5,6 & 7)
3. Identify and show students inspection points of transport container/vehicle to observe for any signs of abnormality or damage. (* 1,2,3 & 4)
4. Demonstrate internal and external inspection of transport container/vehicle. (* 2,3,4,5,6 & 7)
5. Review handling procedures of isotopes and demonstrate how to place container in transport vehicle and secure for transport. (* 2,3,4,8 & 9)
6. Discuss institution's policies regarding transport of isotopes and demonstrate proper transport of the isotope to its destination. (* 1)
7. Demonstrate how to remove the storage container using prescribed handling techniques, and secure in designated location. (* 1,2,3 & 4)
8. Review procedure for inspection of storage container. (* 2,3,6 & 7)
9. Identify procedure to report damage to transport container/vehicle. (* 1)
10. Monitor students as they practice transporting radioactive isotopes within the institution. (* 8 & 9)
11. Supervise and evaluate students transporting radioactive isotopes within the institution. (* 10)

CRITERION-REFERENCED MEASURE:

The student must place isotope in transportation vehicle/container, transport radioactive isotope to its destination, remove isotope from transportation vehicle/container, and check isotope storage container for damage.

PERFORMANCE GUIDE:

1. Verify physician's order and obtain radioactive material transportation authorization.
2. Identify and obtain radioactive isotope to be transported.
3. Obtain necessary transportation container/vehicle.
4. Inspect transportation container/vehicle for cracks, breaks, separation, or damage to protective shielding.
5. Secure radioactive isotope in an approved storage container.
6. Place storage container in an approved lead lined transportation container and secure.
7. Push or carry the radiation transport vehicle container, following the institution's established radioactive materials route.
8. Remove radioactive isotope storage container from transport vehicle/container when destination is reached.
   NOTE: Opening of the vehicle container must not occur prior to destination arrival, unless absolutely necessary.
9. Check isotope storage container for leaks, cracks, or other damage.

CHECKLIST

DUTY Practicing Radiation Safety

TASK Transport radioactive isotopes within the institution.

ENABLER

1. Identify location radioactive isotope is to be transported to.
2. Locate approved radioactive transport vehicle or container.
3. Establish radioactive materials route to be followed.
4. Recall safety precautions to be followed when transporting radioactive isotopes.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME____________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to transport radioactive isotopes within the institution.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Verified physician's order and obtained radioactive material transportation authorization.		
2.	Identified and obtained radioactive isotope to be transported.		
3.	Obtained necessary transportation container/vehicle.		
4.	Inspected transportation container/vehicle for cracks, breaks, separation, or damage to protective shielding.		
5.	Secured radioactive isotope in an approved storage container.		
6.	Placed storage container in an approved lead lined transportation container and secured.		

PERFORMANCE DETERMINANTS (cont.)	YES	NO
7. Pushed or carried the radiation transport vehicle container, following the institution's established radioactive materials route.	________	________
8. Removed radioactive isotope storage container from transport vehicle/ container, when destination was reached.	________	________
9. Checked isotope storage container for leaks, cracks, or other damage.	________	________

DUTY: CONTINUING EDUCATION

PERFORMANCE OBJECTIVE NO. 225

TASK: Maintain membership in national registry and professional organizations.

STANDARD OF PERFORMANCE OF TASK:

Technologists must have completed a program of formal education which has been approved by the committee on Allied Health Education and Accreditation, and must be a certified technologist in the radiologic technology discipline/field.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Pen/pencil
Membership application form

ENABLING OBJECTIVES:

1. Identify professional organizations and their benefits.
2. Identify application requirements and fees.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.
3. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. Louis, MO: C.V. Mosby Company.
4. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.
5. Fleishcher, A., & Everette, J. (1980). Introduction to diagnostic sonography. New York, NY: John Wiley and Sons, Inc.
6. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
7. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.

***RESOURCES:** (cont.)

8. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.
9. Professional organizations' informational brochures.
10. Membership applications.
11. Checklist - Completing membership application.

TEACHING ACTIVITIES:

1. Discuss pros and cons of professional organizations. (* 6 & 7)
2. List major organizations in each of the major fields: radiology, nuclear medicine, radiation therapy and ultrasound. (* 2,3,4,5,6,7 & 8)
3. List contact persons and phone numbers for the major organizations. (* 2,3,5,6,7 & 9)
4. Show students informational brochures for the major organizations. (* 9)
5. Discuss membership requirements and fees. (* 9 & 10)
6. Explain membership application forms. (* 10)
7. Review procedure for processing applications form. (* 9 & 10)
8. Demonstrate procedure for processing application forms.
9. Stress the importance of staying current with changing technology and being certified prior to employment. (* 1,6 & 7)
10. Instruct students to review the professional organizations in their field of interest. (* 9)
11. Assign students to submit a membership application to the organization of their choice. (* 11)

CRITERION-REFERENCED MEASURE:

The student must review professional organization information, select an organization within their specialty field, and submit an application to the organization.

PERFORMANCE GUIDE:

1. Obtain membership application form for appropriate radiologic discipline/field:
   A. Radiologic technology.
   B. Nuclear medicine technology.
   C. Radiation therapy technology.
   D. Ultrasound/diagnostic medical sonography technology.

PERFORMANCE GUIDE: (cont.)

2. Complete and sign membership application form.
3. Submit completed membership application form to radiologic technology program director/ administrator for required signatures and/or funding.
4. Submit membership application form to registry or professional organization.

CHECKLIST

DUTY Continuing Education

TASK Maintain membership in national registry and professional organizations.

ENABLER

1. Identify professional organizations and their benefits.

STUDENT'S NAME____________________ **DATE**__________

EVALUATOR'S NAME____________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to maintain membership in national registry and professional organizations

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Obtained membership application form for appropriate radiologic discipline/field.		
2. Completed and signed membership application form.		
3. Submitted completed membership application form to radiologic technology program director/administrator for required signatures and/or funding.		
4. Submitted membership application form to registry or professional organization.		

DUTY: CONTINUING EDUCATION

PERFORMANCE OBJECTIVE NO. 226

TASK: Maintain continuing education points.

STANDARD OF PERFORMANCE OF TASK:

The technologist must obtain a minimum of twelve continuing education points per year or a total of sixty points every five years.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

In-service attendance form
Course grade report card/form

ENABLING OBJECTIVES:

1. Recall methods of obtaining continuing education points.
2. Identify department's requirements for continuing education points.
3. Review established department policy/procedure for maintaining continuing education points.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Continuing education record.
5. Continuing education point requirements.
6. Checklist - Maintaining continuing education points.

TEACHING ACTIVITIES:

1. Review and show students how to maintain a personal record of continuing education points.
(* 1,2,3 & 4)

TEACHING ACTIVITIES: (cont.)

2. Identify sources of in-service workshops or courses and dates. (* 1)
3. Review requirements of C.E. points needed.
4. Explain and show students how to verify attendance approval and complete paperwork according to hospital policy. (* 1,2 & 3)
5. Monitor students practicing creating a continuing education file. (* 4 & 5)
6. Assign students to maintain a continuing education file. (* 6)

CRITERION-REFERENCED MEASURE:

The student must create continuing education point file, identify number of points needed, identify inservice/workshops, and inform chief technologist of inservice/workshop you want to attend.

PERFORMANCE GUIDE:

1. Maintain personal record of continuing education points.
    A. Name of in-service or course and sponsoring agency.
    B. Dates and time attended.
    C. Number of C.E. points received.
    D. Total number of C.E. points received to date.
2. Identify available in-service workshops or courses and dates.
3. Determine number of C.E. points needed.
4. Inform Chief Technologist or administrator of in-service/course you wish to attend.
5. Verify attendance approval and complete paperwork required by the hospital and the educational agency.

CHECKLIST

DUTY Continuing Education

TASK Maintain continuing education points.

ENABLER

1. Recall methods of obtaining continuing education points.
2. Identify department's requirements for continuing education points.

STUDENT'S NAME________________ **DATE**__________

EVALUATOR'S NAME________________ **COURSE**__________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to maintain continuing education points.

PERFORMANCE DETERMINANTS	**YES**	**NO**
1. Maintained personal record of continuing education points:		
- Name of in-service or course and sponsoring agency.	______	______
- Dates and time attended.	______	______
- Number of C.E. points received.	______	______
- Total number of C.E. points received to date.	______	______
2. Identified available in-service workshops or courses and dates.	______	______
3. Determined number of C.E. points needed.	______	______
4. Informed Chief Technologist or administrator of in-service/course to be attended.	______	______
5. Verified attendance approval and completed paperwork required by the hospital and the educational agency.	______	______

DUTY: CONTINUING EDUCATION

PERFORMANCE OBJECTIVE NO. 227

TASK: Participate in professional organization meetings.

STANDARD OF PERFORMANCE OF TASK:

The technologist must attend professional organization meetings and interact with colleagues and other radiologic technology professionals on a regular basis as work scheduling permits.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Work schedule
Note pad
Meeting agenda
Pen/pencil
Calendar of events

ENABLING OBJECTIVES:

1. Review parlimentary procedure for interaction in meetings.
2. Review established department policy for participating in professional organization meetings.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Work schedule.
5. Calendar of events.
6. Checklist - Participating in professional meetings.

TEACHING ACTIVITIES:

1. Show students how to check calender of events and work schedule to determine if meeting can be attended. (* 1,2 & 5)
2. Explain to students how to obtain meeting agenda prior to meeting. (* 1 & 6)
3. Demonstrate procedure for arranging work schedule around meeting. (* 3 & 4)
4. Review parliamentary procedure to be used in the meeting.
5. Discuss importance of participating in professional meetings. (* 1,2 & 3)
6. Discuss and demonstrate techniques for sharing information with colleagues. (* 1,2 & 3)
7. Monitor students practicing professional meeting participation. (* 4,5 & 6)
8. Evaluate students' participation in a professional meeting. (* 7)

CRITERION-REFERENCED MEASURE:

The student must identify professional meetings they wish to attend, check work schedule, verify meeting agenda, identify areas of interest, participate in meeting, and share pertinent information with colleagues.

PERFORMANCE GUIDE:

1. Check calendar of events to determine meeting data and time.
2. Check work schedule to determine if the meeting can be attended.
3. Obtain meeting agenda prior to meeting date.
4. Identify items of interest and assemble materials or make notes of information you wish to input at the meeting.
5. Contact colleagues who may be interested in attending the meeting and arrange transportation or meeting place.
6. Arrive at meeting place at least 15 minutes prior to scheduled meeting time.
7. Follow parliamentary procedures during the meeting.
8. Participate in discussions and activities whenever possible.
9. Make note of points of interests to share with colleagues not able to attend.

CHECKLIST

DUTY Continuing Education

TASK Participate in professional organization meetings.

ENABLER

1. Recall radiologic professional organizations.
2. Arrange to be off work during meeting time.

STUDENT'S NAME________________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to participate in professional organization meetings.

PERFORMANCE DETERMINANTS	YES	NO
1. Checked calendar of events to determine meeting date and time.	______	______
2. Checked work schedule to determine if the meeting can be attended.	______	______
3. Obtained meeting agenda prior to meeting date.	______	______
4. Identified items of interest and assembled materials or made notes of information you wish to input at the meeting.	______	______
5. Contacted colleagues who may be interested in attending the meeting and arranged transportation or meeting place.	______	______
6. Arrived at meeting place at least 15 minutes prior to scheduled meeting time.	______	______
7. Followed parliamentary procedures during the meeting.	______	______

PERFORMANCE DETERMINANTS: (cont.)	YES	NO
8. Participated in discussions and activities whenever possible.	________	________
9. Made note of points of interests to share with colleagues not able to attend.	________	________

DUTY: CONTINUING EDUCATION

PERFORMANCE OBJECTIVE NO. 228

TASK: Attend in-service workshops.

STANDARD OF PERFORMANCE OF TASK:

The technologist must participate in the in-service workshop and provide the department director/administrator with acceptable proof of attendance and participation in accordance with established department procedures.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Note pad
Pen/pencil
In-service workshop information
Department workshop participation form

ENABLING OBJECTIVES:

1. Identify date of workshop.
2. Recall workshop information.
3. Review established department policy for attending workshops.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Workshop information.
5. Department workshop participation form.
6. Checklist - Attending in-service workshop.

TEACHING ACTIVITIES:

1. Review procedure to verify administrative approval and to obtain participation form.
2. Discuss and demonstrate method for verifying workshop information. (* 1,2 & 4)
3. Demonstrate how to complete a workshop participation form. (* 3 & 5)
4. Explain how to obtain appropriate signature on participation form upon completion of the workshop.
5. Discuss procedure to verify continuing education points with hospital. (* 1)
6. Explain procedure for submitting participation form for continuing education points. (* 1,2 & 5)
7. Monitor students practicing in-service workshop participation. (* 4 & 5)
8. Assign students to attend an in-service workshop. (* 6)

CRITERION-REFERENCED MEASURE:

The student must obtain administrative approval for attendance, verify workshop information, participate in workshop, obtain proof of attendance and submit proof to department director.

PERFORMANCE GUIDE:

1. Verify administrative approval to attend in-service workshop and obtain participation form.
2. Verify workshop information:
   - A. Place.
   - B. Date.
   - C. Time.
   - D. Materials needed.
   - E. Continuing education points.
   - F. Cost.
   - G. Registration dates.
3. Arrive at workshop prior to the scheduled starting time.
4. Participate in the workshop.
5. Obtain appropriate signature on participation form upon completion of the workshop.
6. Submit participation form to department director/ administrator and verify continuing education points received.

CHECKLIST

DUTY Continuing Education

TASK Attend in-service workshops.

ENABLER

1. Identify date of workshop.
2. Recall workshop information.

STUDENT'S NAME______________________________**DATE**__________

EVALUATOR'S NAME______________________________**COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to attend in-service workshops.

PERFORMANCE DETERMINANTS	YES	NO
1. Verified administrative approval to attend in-service workshop and obtained participation form.		
2. Verified workshop information:		
- Place.		
- Date.		
- Time.		
- Materials needed.		
- Continuing education points.		
- Cost.		
- Registration dates.		
3. Arrived at workshop prior to the scheduled starting time.		
4. Participated in the workshop.		

PERFORMANCE DETERMINANTS: (cont)	YES	NO
5. Obtained appropriate signature on participation form upon completion of the workshop.	______	______
6. Submitted participation form to department director/administrator and verified continuing education points received.	______	______

DUTY: CONTINUING EDUCATION

PERFORMANCE OBJECTIVE NO. 229

TASK: Remain up-to-date on new developments in the radiologic technology field.

STANDARD OF PERFORMANCE OF TASK:

The technologist must be knowledgeable concerning new developments in the radiologic technology field, including new procedures, techniques, and equipment.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

File folders
File cabinets
Radiologic magazines/journals
Radiologic equipment catalogs
Radiologic educational programs
Radiologic in-service workshops
Radiologic professional organizations

ENABLING OBJECTIVES:

1. Recall sources of radiologic technology information.
2. Review established department policy for remaining up-to-date in radiologic technology field.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Radiologic magazines, journals and catalogs.
5. Radiologic educational programs and workshops.
6. Radiologic professional organization pamphlets.
7. Checklist - Remaining up-to-date in radiologic technology field.

TEACHING ACTIVITIES:

1. Conduct class discussion on sources of information concerning new radiologic development. (* 1,2 & 3)
2. Explain and show students how to create a file for new information according to procedure, technique and equipment. (* 4,5 & 6)
3. Discuss ways of sharing pertinent information with colleagues. (* 1,2 & 3)
4. Instruct student to collect radiologic technology information. (* 4,5 & 6)
5. Evaluate student's performance while gathering new radiologic information. (* 7)

CRITERION-REFERENCED MEASURE:

The student must identify sources for radiologic technology, compile new information, create file for information and file information according to topic.

PERFORMANCE GUIDE:

1. Identify source for information concerning new radiologic development:
   - A. Magazines/journals.
   - B. Professional organizations.
   - C. Educational programs.
   - D. In-service workshops.
   - E. Equipment catalog.
2. Compile information concerning the new development.
3. Study and review the information.
4. Create a file for the new information.
5. File the information according to topic:
   - A. Procedure.
   - B. Technique.
   - C. Equipment.
6. Share pertinent information with colleagues.

CHECKLIST

DUTY Continuing Education

TASK Remain up-to-date on new developments in the radiologic technology field.

ENABLER

1. Recall sources of radiologic technology information.

STUDENT'S NAME ____________________ **DATE** __________

EVALUATOR'S NAME ____________________ **COURSE** __________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to remain up-to-date on new developments in the radiologic technology field.

PERFORMANCE DETERMINANTS	YES	NO
1. Identified source for information concerning new radiologic developments.		
2. Compiled information concerning the new developments.		
3. Studied and reviewed the information.		
4. Created a file for the new information.		
5. Filed the information according to topic:		
- Procedure.		
- Technique.		
- Equipment.		
6. Shared pertinent information with colleagues.		

DUTY: CONTINUING EDUCATION

PERFORMANCE OBJECTIVE NO. 230

TASK: Instruct secondary and post-secondary health occupations courses.

STANDARD OF PERFORMANCE OF TASK:

The technologist must provide instruction, experience and supervision to students training in the clinical setting.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Radiologic work setting
Clinical experience student

ENABLING OBJECTIVES:

1. Identify level of health occupations course.
2. Recall hospital program areas.
3. Identify clinical experience program area.
4. Review established department policy/procedures for instructing secondary and post-secondary health occupations courses.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. Department work schedule.
5. Health occupations program plan.
6. Clinical experience guidelines.
7. Checklist - Instructing secondary and post-secondary health occupations courses.

TEACHING ACTIVITIES:

1. Demonstrate procedure for greeting students. (* 1,2 & 3)
2. Review hospital procedures. (* 1,2 & 5)
3. Explain how to make and read work schedule. (* 1,2,3 & 4)
4. Conduct class discussion on involving student in treatment or procedure whenever ethically possible. (* 1,5 & 6)
5. Stress that students should not be left unsupervised when working with a patient or hospital equipment. (* 1,2 & 3)
6. Monitor students practicing instructing health occupations courses. (* 7)

CRITERION-REFERENCED MEASURE:

The student must report to assigned hospital, learn hospital policy(s) and demonstrate a high quality of professionalism and ethics around the patient and other technologist. The student shall be accountable to and under direct supervision of an assigned technologist at all times.

PERFORMANCE GUIDE:

1. Greet student and explain hospital policies.
2. Discuss work schedule with student.
3. Explain procedure to student.
4. Instruct student as to their part in the procedure.
5. Answer any questions the student may have.
6. Supervise the student at all times while on duty.
   CAUTION: Never leave the student unsupervised when working with a patient or hospital equipment.
7. Involve the student in treatment or procedure whenever ethically possible.

CHECKLIST

DUTY Continuing Education

TASK Instruct secondary and post-secondary health occupations courses.

ENABLER

1. Identify level of health occupation course.
2. Recall hospital program areas.
3. Identify clinical experience program area.
4. Review established department policy/procedures for instructing secondary and post-secondary health occupations courses.

STUDENT'S NAME ______________________________ **DATE** __________

EVALUATOR'S NAME ____________________________ **COURSE** ________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to instruct secondary and post-secondary health occupations courses.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Greeted student and explained hospital policies.	______	______
2.	Discussed work schedule with student.	______	______
3.	Explained procedure to student.	______	______
4.	Instructed student as to his/her part in the procedure.	______	______
5.	Answered any questions the student may have.	______	______
6.	Supervised the student at all times while on duty.	______	______
7.	Involved the student in treatment or procedure whenever ethically possible.	______	______

DUTY: CONTINUING EDUCATION

PERFORMANCE OBJECTIVE NO. 231

TASK: Conduct in-service workshops.

STANDARD OF PERFORMANCE OF TASK:

Advance notice of in-service must be given and attendance and education records must be completed without error and retained for each in-service.

SOURCE OF STANDARD:

Writing team of incumbent workers.

CONDITIONS FOR PERFORMANCE OF TASK:

Details of meeting
Meeting room
List of participants
In-service program file
Audio-visual equipment
Blank in-service attendance sheet
Blank in-service education report

ENABLING OBJECTIVES:

1. Recall in-service workshop topic.
2. Notify technologists regarding workshops topic and time.
3. Assemble audio-visual equipment needed.
4. Review established department policy/procedure for conducting in-service workshop.

***RESOURCES:**

1. Department policy/procedure manual.
2. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.
3. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.
4. In-service notice.
5. Meeting room/audio video equipment.
6. In-service attendance sheets.
7. In-service education report.
8. Checklist - Conducting in-service workshop.

TEACHING ACTIVITIES:

1. Explain how to obtain and review schedule to set date of in-service. (* 1,2 & 3)
2. Show students how to complete in-service notice. (* 1,2,3 & 4)
3. Conduct class discussion on details that need to be planned in advanced, i.e. arranging speakers, meeting room, audiovisual equipment. (* 2,3,4 & 5)
4. Show students how to record attendance on in-service sheet. (* 6)
5. Show students how to complete an in-service education report. (* 7)
6. Identify procedure for filing attendance sheet and in-service reports. (* 1)
7. Monitor students' performance while they practice conducting an in-service workshop. (* 4,5,6 & 7)
8. Evaluate students performance while conducting an in-service workshop. (* 8)

CRITERION-REFERENCED MEASURE:

The student must review in-service workshop schedule, complete in-service notice, arrange for meeting room and audio-visual equipment, record workshop attendance, and complete an in-service education report.

PERFORMANCE GUIDE:

1. Obtain and review schedule for in-service programs.
2. Complete in-service notice including:
   A. Subject.
   B. Time.
   C. Place.
   D. Date.
   E. Name(s) of presenter(s).
   F. List of participants.
3. Notify presenter(s) of details of in-service program.
4. Reserve audio-visual equipment.
5. Post notice approximately two weeks in advance.
6. Set up meeting room:
   A. Chairs.
   B. Audio-visual equipment.
7. Record attendance on in-service sheet including:
   A. Name of staff member.
   B. Department.
   C. Position.
   D. Date.

PERFORMANCE GUIDE: (cont.)

8. Complete in-service education report including:
    - A. Date and time.
    - B. Topic.
    - C. Evaluation.
    - D. Name(s) of presenter(s).
9. Attach attendance sheet to in-service report.
10. File attendance sheet and in-service report.

CHECKLIST

DUTY Continuing Education

TASK Conduct in-service workshops.

ENABLER

1. Recall in-service workshop topic.
2. Notify technologists regarding workshop's topic and time.
3. Assemble audio-visual equipment needed.

STUDENT'S NAME______________________________ **DATE**__________

EVALUATOR'S NAME____________________________ **COURSE**________

DIRECTIONS TO THE EVALUATOR:

Use the following checklist to evaluate a student's ability to conduct in-service workshops.

	PERFORMANCE DETERMINANTS	YES	NO
1.	Obtained and reviewed schedule for in-service programs.		
2.	Completed in-service notice including:		
	- Subject.		
	- Time.		
	- Place.		
	- Date.		
	- Name(s) of presenter(s).		
	- List of participants.		
3.	Notified presenter(s) of details of in-service program.		
4.	Reserved audio-visual equipment.		
5.	Posted notice approximately two weeks in advance.		

PERFORMANCE DETERMINANTS: (cont.)	YES	NO
6. Set up meeting room:		
- Chairs.		
- Audio-visual equipment.		
7. Record attendance on in-service sheet including:		
- Name of staff member.		
- Department.		
- Position.		
- Date.		
8. Completed in-service education report including:		
- Date and time.		
- Topic.		
- Evaluation.		
- Name(s) of presenter(s).		
9. Attached attendance sheet to in-service report.		
10. Filed attendance sheet and in-service report.		

APPENDICES

APPENDIX A

TASK LIST AND JOB TITLES

RADIOLOGIC TECHNOLOGY OCCUPATIONS
CIP Code: 41.0204

Radiologic Technologist, Chief
DOT: 078.162-010

Radiologic Technologist
DOT: 078.362-026

Nuclear Medicine Technologist
DOT: 078.361-018

Radiation Therapy Technologist
DOT: 078.361-034

Ultrasound Technologist
DOT: 078.364-010

DUTIES:

Tasks

DUTY A: PERFORMING ADMINISTRATIVE AND CLERICAL FUNCTIONS

Schedule departmental work load
Assign daily work to employees
Maintain daily log of examination/therapy procedures performed
Maintain monthly examination count chart
Prepare maintenance requests
Schedule exams and special procedures
Check reason for non-appearance of patient for scheduled examination/treatment
Develop policy and procedure manuals
Develop preexam and post-exam procedure sheets
Develop patient information sheets
Prepare exam report forms/charts for doctor
Follow-up patient diagnosis
Monitor staff exposure to radiation
Prepare safety and accident reports
Perform radiologic equipment quality control check
Establish working rapport with all interrelating hospital, referral or commercial agencies

DUTY A: PERFORMING ADMINISTRATIVE AND CELRICAL DUTIES (cont.)

Orientate new technologists to departmental standard operating and administrative procedures, floor plans, equipment and supplies locations
Evaluate employees' performance
Maintain license compliance regulations
Maintain supply inventory
Store pharmaceutical supplies
Store non-drug materials/supplies
Maintain inventory of radionuclides
Store radioactive materials/supplies
Prepare equipment purchase request
Maintain equipment inventory
Schedule transportation of patient to and from examination and treatment area
Chart patient's medical history
Check for signed permission forms
Check patient's pre-imaging preparations
Consult with referring physician regarding patient's medical history and examination procedure
Complete patient identification on labels and forms
Update patient's records
File patient's records
Maintain radiologic master card file
Maintain report and film file
Maintain records of patient's radiation dosage
File departmental records
Determine examination charge and coding
Conduct departmental meeting
Supervise clinical experience of students
Maintain student's clinical experience records
Maintain employee continuing education files

DUTY B: PERFORMING PATIENT CARE SERVICES

Transport patient in wheelchair
Transport patient on a stretcher
Turn patient on table
Take patient's blood pressure
Take patient's pulse and respiration
Administer intravenous infusion (injection)
Administer oxygen to patient
Transfer patient between examination table and wheelchair
Transfer patient between stretcher and examination table
Immobilize pediatric patient
Prep patient's skin
Regulate intravenous infusion
Record physical statistics of patient

DUTY B: PERFORMING PATIENT CARE SERVICES (cont.)

Disconnect intravenous infusion
Prepare patient for examination/treatment
Change patient's bandage/dressing
Fill patient's bladder
Handle a patient with a spine or skull injury
Position bedpan or urinal for patient
Provide assistance for a vomiting patient
Assess basic first aid needs of patient
Administer cardiopulmonary resuscitation to a patient with cardiac arrest
Administer artificial ventilation to a patient
Escort patient to and from waiting area, dressing room, examination room, or treatment room
Administer emergency care for patient having severe adverse reaction to radiographic contrast media, procedures, or accident
Apply lead contacts (spatula-type) internal eye shield
Insert radiopaque probe into female patient's vagina to localize cervix
Administer prescribed medication to patient orally
Inform patient or family member about examination/treatment procedures
Inject patient intramuscularly

DUTY C: PERFORMING SUPPORT SERVICES

Set up procedure trays for special examinations
Clean radiographic, equipment and facilities
Administer contrast media orally
Administer contrast media rectally
Administer contrast through urinary catheters
Administer contrast media intravenously
Don sterile gowns, masks and gloves
Wash hands and arms aseptically
Prepare video tape of screen display
Prepare specimens for transfer
Perform focal spot test
Perform spot film test
Perform spin top test
Prepare fluoroscopic spot film device
Test cassettes for screen contact
Perform x-ray beam alignment test
Place film on illuminators
Draw blood sample
Test accuracy of scan camera
Maintain non-prescription stock in examining room
Prepare subtraction prints
Process exposed film in automatic processor
Duplicate radiographs

DUTY C: PERFORMING SUPPORT SERVICES (cont.)

Clean intensifying screens
Clean film processing equipment
Prepare film holders
Perform safelight test
Process x-ray film manually
Take photographs of patient's treatment area
Prepare examination room for use
Perform simulation procedures for patient receiving external beam radiation therapy
Process axial tomography (CT) scan
Prepare fluorographic control and phototimer
Load empty cassette with x-ray film
Position patient for examination
Apply coupling media to examination area
Prepare transducer for examination
Identify ultrasound equipment limitations
Perform radiographic equipment test and calibration check
Conduct scanner operational check
Position scanning arm/transducer
Record test results using a hard copy method
Conduct accuracy test of recording equipment
Prepare sterile examining device
Elute generator
Perform Mo99 breakthrough test on eluate
Analyze the eluate
Calculate quantity of radiopharmaceuticals needed for the day
Prepare the radiopharmaceutical
Perform radiopharmaceutical labeling efficiency test
Process individual radiopharmaceutical (I 125)
Administer radiopharmaceutical
Prepare imaging room for specific procedure
Aquire images
Enhance computer images
Extract patient's blood
Prepare radioimmunoassay kit
Prepare radioassay quality control material
Evaluate analysis (assay) kits
Count sample
Prepare reference standard
Collect urine samples
Perform computer data acquisition
Draw region of interest
Display computer results for doctor's interpretation
Record accumulated radiation doses on radiotherapy treatment charts
Calculate external beam radiation treatment plan dosage

DUTY C: PERFORMING SUPPORT SERVICES (cont.)

Schedule block-cutting procedures to fabricate treatment devices
Prepare contour drawing of the radiation treatment area
Fabricate treatment shell using the direct technique
Fabricate treatment mold using the indirect method
Prepare intracavitary mold or surface applicator mold to receive radioactive sealed sources
Prepare a solid cast for shaping lead shields
Form a plastic treatment shell, using vacuum forming machine
Form an intraoral, surface stent, or dental wax impression of patient
Fabricate a bite-block mold from a wax cast
Prepare a lead bite block from a wax cast set in plaster mold
Apply bolus to treatment shell
Fabricate lead shielding for treatment fields
Fabricate lead shielding on a plaster cast of patient
Cut treatment portals out of treatment shell
Fabricate contact (spatula-type) internal eye shield
Fit treatment shell to patient
Prepare external beam blocks of prescribed shapes for use in shadow tray
Fabricate styrofoam molds for beam blocking
Fabricate customized lead shielding beam blocks with styrofoam molds
Perform initial set-up procedure for patient receiving external beam radiation therapy
Fabricate comp-filter to compensate for varing thickness of treatment area
Apply bolus to treatment area
Perform computerized treatment planning

DUTY D: PERFORMING TESTING/THERAPUTIC PROCEDURES

Perform radiography using stationary x-ray units
Perform radiography using portable x-ray unit
Conduct computerized tomography scans
Perform tomography
Conduct operating room radiography
Conduct xeroradiography
Perform mammography
Conduct/assist contrast radiographs
Assist with fluorographic studies
Perform fistual sinus tract radiographs (x-rays)
Conduct cardiac catheterization and angiocardiograms examination
Conduct arteriography examination
Perform venography examination

DUTY D: PERFORMING TESTING/THERAPUTIC PROCEDURES (cont.)

Assist with lymphangiograms
Conduct myelograms examination
Assist with arthrograms examination
Assist with trans-hepatic cholangiograms exam
Conduct scans using Gamma IV camera
Assist with hysterosalpingography examination (non-gravid patient)
Conduct localization radiographs
Assist with bronchograms examination
Perform intravenous pyelograms
Conduct voiding cystogram examination
Conduct intravenous cholangiograms examination
Perform echocardiogram examination
Conduct ultrasound abdominal examination
Conduct pelvic ultrasound examination
Conduct doppler studies circulatory system exam
Conduct ultrasound small parts examination
Conduct ultrasound extremities examination
Conduct ultrasound breast examination
Conduct ultrasound needle localization
Conduct obstetric ultrasound examination
Operate ultrasound equipment
Administer external beam radiation therapy to patient's treatment area
Conduct localization films of intracavitary applicator or interstitial implant prior to treatment
Calibrate well counter and probes
Calculate biological half-life clearance
Calculate in-vivo volume of body fluids
Calculate percent activity in excreted biological specimen
Calculate percent uptaken in target organ
Calculate activity level
Plot assay results
Review quality control graphs
Perform radioassay study
Separate serum from whole blood
Critique radiograph films
Critique ultrasound study
Critique nuclear medicine studies
Conduct radiation therapy portal/verification films
Verify correct treatment area from portal films

DUTY E: PRACTICING RADIATION SAFETY

Perform wipe-test of work area
Replace Xenon trap cartridges
Perform radiation work area survey
Receive radionuclides shipment
Decontaminate radiation work area

DUTY E: PRACTICING RADIATION SAFETY (cont.)

Dispose of radioactive waste
Perform calibration tests on radiation survey instruments
Post radiation signs on patient bed, room and danger zones
Dispose of radiactive contaminated materials
Transport radioactive isotopes within the institution

DUTY F: CONTINUING EDUCATION

Maintain membership in national registry and professional organizations
Maintain continuing education points
Participate in professional organization meetings
Attend in-service workshops
Remain up-to-date on new developments in the radiologic technology field
Instruct secondary and post-secondary health occupations courses
Conduct in-service workshops

APPENDIX B

DEFINITIONS OF TERMS

1. **AFFECTIVE**. Skills which emphasize an attitude, feeling, emotion, or degree of acceptance and rejection.

2. **ALARA**. A radiation safety acronym meaning that a non-prescribed radiation exposure be kept: " as low as reasonably achievable".

3. **ALIQUOT**. A small but representative and reproducible part of a solution, or sample.

4. **ASEPTIC**. Not septic (alive); free from septic (living) materials.

5. **BIOLOGIC HALF-LIFE**. The time required for the body to eliminate one half of an administered dose of any substance. This time is approximately the same for both stable and radioactive isotopes of a particular element.

6. **CATALOG**. A comprehensive collection of performance objectives, performance guides, and related data developed in a specific domain.

7. **CHECKPOINT**. A point in the development of the curriculum guide when materials must be sent to V-TECS control office for quality review.

8. **CIP CODE**. A code developed by the U.S. Office of Education to identify a specific cluster of related jobs for training program identification.

9. **COGNITIVE**. Skills which emphasize the recall of knowledge and development of intellectual abilities.

10. **COLLIMATOR**. An apparatus used for confining the elements of a beam within an assigned solid angle.

11. **COMPETENCY**. The ability (including knowledge, skills, and/ or attitudes) to perform a specific task of duty successfully.

12. **COMPETENCY-BASED EDUCATION**. Educational program in which students are given specific requirements for individual performances which must be met in order to advance in instruction.

13. **COMPETENCY-BASED-VOCATIONAL EDUCATION.** A methodology of instruction that (a) identifies the competencies needed for on-the-job performance; (b) informs students and required to achieve these competencies; (c) emphasizes requirements, and/or graduation; and (d) facilitate learning by letting each student master the tasks prior to advancing to another.

14. **COMPOUNDING.** A pharmacy term describing the making of a drug or radiopharmaceutical.

15. **CONSORTIUM.** A group of state agencies, institutions, or other entities which have been legally constituted through letters of commitment, agreements, or by assignment of higher authorities to work together toward the solution of problems in education. A consortium, for the purposes of this work, must have membership from autonomous agencies and institutions which have cut across state boundaries as they attempt to solve problems or meet goals.

16. **COUNT (Radiation measurements).** An external indication given by a device designed to enumerate ionizing events. It may refer to a single detected event or to the total number that is registered in a given period of time.

17. **CRITERION-REFERENCED MEASURES.** An evaluative procedure used to determine if a student has mastered a performance objective.

18. **CROSS-REFERENCE TABLE.** A table that identifies the relationship among duties and tasks found in the occupational inventory and the performance objectives in the final catalog. Also noted are percentages of incumbents performing the tasks by D.O.T. number.

19. **DICTIONARY OF OCCUPATIONAL TITLES (D.O.T.).** A document published by the U.S. Department of Labor, Employment, and Training Administration. This publication groups occupations into systematic occupational classification structures based on interrelationships of job tasks and requirements.

20. **DOMAIN (Occupational Domain).** A group of job titles that are related on the basis of required skills and knowledge. D.O.T. CODE. A nine-digit number used to identify a specific job within a given cluster.

21. **DOSE (Dosage).** The radiation delivered to the whole body or to a specified area or volume.

22. **D.O.T. CODE**. A nine-digit number identifying a specific occupation, taken from the Dictionary of Occupational Titles developed by the U.S. Department of Labor.

23. **DUTY**. One of the distinct, major work activities in an occupational area. A duty is made of numerous tasks. A duty lends itself to the design of units of instruction.

24. **ENABLING OBJECTIVES**. Objectives identifying support knowledge, and subskills, that are prerequisites to the mastery of a task.

25. **GENERATOR**. Consisting of a column of ion exchange material onto which has been affixed the parent nuclide, the generator provides a means of obtaining short-lived radionuclides, e.g., the Mo99/Tc99m generator.

26. **HEMATOCRIT**. The volume of the red blood cells per unit volume of blood in circulation.

27. **IN-VITRO**. A Latin term referring to that which is outside of the body.

28. **IN-VIVO**. A Latin term referring to that which is within the body.

29. **LABELED COMPOUND**. A compound consisting, in part, of labeled molecules. By observations of radioactivity or isotopic composition, this compound or its fragments can be followed through various physical, chemical, or biological processes.

30. **MICROCURIE (uCi)**. 3.7x10 disintegrations per second.

31. **MILLICURIE (mCi)**. 3.7x10 disintegrations per second.

32. **OCCUPATIONAL ANALYSIS (Task Analysis)**. The process of reviewing elements of a job for the purpose of improving training program content across program levels of vocational-technical education.

33. **OCCUPATIONAL INVENTORY**. An instrument used to obtain responses from workers on what duties and tasks are actually performed in an occupational area.

34. **OCCUPATIONAL INVENTORY (Task Inventory Booklet)**. A survey instrument listing tasks performed and tools and equipment used by job incumbents in an occupational domain.

35. **OCCUPATIONAL SURVEY**. The procedures for collecting data to identify the duties and tasks that comprise one or more jobs, job types, or career field ladders for the collection and analysis of information concerning such duties.

36. **PERFORMANCE-BASED INSTRUCTION.** Instruction which requires the learner's demonstration of specific competencies. The desired abilities are selected before the instruction is described and are clearly defined as observable performance objectives.

37. **PERFORMANCE CHECKLIST.** A list of performance steps derived from the performance guide to record acceptable or unacceptable performance of each step of a task.

38. **PERFORMANCE GUIDE (PG).** A series of steps required for performance of a task arranged in the sequence ordinarily followed.

39. **PERFORMANCE OBJECTIVE (PO).** A statement, in precise measurable terms, of a particular behavior to be exhibited by a learner under specified conditions, including a standard of performance.

    a. **Conditions: "Given what?"** Describes the situation, including tools and equipment to be used, and limits under which the tasks will be performed.

    b. **Task: "Does what?"** States the observable activity the learner will perform.

    c. **Standard: "How well?"** Indicates performance required of a successful incumbent worker in an actual job environment.

40. **PSYCHOMOTOR.** Skills which emphasize manipulation of materials or tools.

41. **QUALITY CONTROL GRAPH.** A graph on which calculated activity levels for long lived radionuclide reference standards or precalibrated radionuclide standards and their confidence intervals are plotted. Observed activity levels can be compared to these established limits.

42. **QUALITY REVIEW.** A review of content by V-TECS director or designated representative to examine quality of content format, and style of curriculum guide.

43. **STATE-OF-THE-ART REFERENCE.** Current materials from which information or resources can be found to facilitate instruction.

44. **STATE-OF-THE-ART (SOA) STUDY.** Research conducted to determine the current status of performance-based instructional materials and practices in the domain area under study and to obtain other information that might be useful in catalog development.

45. **TASK.** A unit of work activity which constitutes logical and necessary steps in the performance of a duty. A task has a definite beginning and ending point in its accomplishments and generally consists of two or more definite steps.

46. **TASK ANALYSIS.** The process of reviewing elements of a job for the purpose of improving training program content across program levels of vocational technical education.

47. **TASK CRITICALITY.** That aspect of a task statement which makes its accomplishment crucial to the acceptable performance of a worker or student.

48. **TASK LIST.** A list of individual tasks which correspond to a specific job title(s) derived from V-TECS catalogs.

49. **TEACHING ACTIVITIES.** Methods and/or procedure delivering instructional contents to students.

APPENDIX C

TOOL AND EQUIPMENT LIST

Tool/Equipment

- Wheelchair
- Cassettes, film
- Grid
- Processor, automatic x-ray film
- Stretcher
- Badge, exposure monitoring
- Scissors
- Syringe
- Records, patient
- Room, examination
- Bin, film
- Sheets, patient information
- Phone
- Sheets, permission
- Watch/clock
- Filters, wedge
- Typewriter
- Box, view
- Card, ID
- Wedge, foam rubber (positioning)
- Jelly/oil, lubricating
- Cart, emergency
- Table, examination
- Pen/pencil, indelible
- Manufacturer's manual/instruction
- Holder, tool
- Oxygen tank
- Tubing, IV
- Table, Imaging
- Intercom
- Cassettes, x-ray
- Needle, injection
- Records, technique
- Charts, technique
- Wedges, foam
- Calipers
- Crash cart (emergency life support equipment)
- Markers, radiopaque R or L
- Shield, lead
- Screen, viewing
- Radiographs, diagnostic
- Monitor, TV
- Strips, lead

Tool/Equipment (cont.)

Media, radiographic contrast
Machine, stationary x-ray
Basin
Lubricant
Solutions, antiseptic
Medium, barium sulfate contrast
Copier, film
Tray, procedure
Foil, lead
Tapes, video cassette
Film, negative
Hammer, ballpeen
Media, contrast
Instructions, pre-written patient
Test object (phantom)
Mask
Machine, portable x-ray
Filer, membrane
Device, immobilization
Records, test
Recorder, video cassette
Unit, diagnostic x-ray
Mixture, barium
Machine, suction
Clamps, various
Camera, Polaroid
Scales/rulers
Film, positive
Calculator, handheld programmable
Stool, examination
Device, positioning
Glassware
Board, arm
Markers, metal
Formatter, multi-image
Computer, digital
Film, emulsion
Catheter, urethra
Injection, intravenous
Lamp, goose-neck procedure
Shield, male gonadal
Generator, 109Cd-109mAg
Ultrasonograms
Transducer
Solutions, radiopaque
Cones
Charts, rad exposure
Tray, Catheterization sterile procedure
Dosimeter, pocket
Markers, dye

Tool/Equipment (cont.)

Bench, work
Gel, aqueous
Bolus
Mammographic paddles and sponges
Vial, sterile
Camera, video
Copier, photo
Catheter, balloon
Indicator, distance
Markers, wax
Box, radiograph plate storage
Scanner, contact ultrasound
Tray, IVP procedure
Chair, examination
Camera. ID
Tray, emergency
Camera, image intensifier scintillation
Markers, radioplaque ID
Transmitter, ultrasound unit
Light system
Isotopes, radioactive
Shield, testicle
Blocks, styrofoam
Carrying case, radiopharmaceutical
Calibrator, radiopharmaceutical dose
Phantom, bar
Filter, compensator
Table, treatment
Scans, radioactive isotope
Plate, radiogrph
Scanner, B-mode
Densitometer
Meter, survey (GM Tubes)
Ring, exposure monitering
Cable, ECG
Wrap, plastic
Sheet, transparent plastic
Media, coupling
Collimators, strip field
Tube, pm (photo-multiplier tubes)
Scanner, M-mode
Sign, out-of-order
Scanners, mechanical sector
System, display
Bag, bolus
Refrigerator/freezer, lead lined
Gloves, rubber
Unit, transverse axial tomography
Oscilloscope, display
Oil, mineral

Tool/Equipment (cont.)

Camera, scintillation
Detectors, scintillation
Wire, lead or solder
Film, Polaroid
Device, support
Blocks, beam
Enema, barium
Fluid, transducer
Positioning device, mechanical
Panel, ultrasonoscope control
Connector, ECG
Film, nonscreen
Arrays, real-time linear
Scales
Cup, lead-shielded
Fluoroscope
Shears
Markers, graduated radiopaque
Controls, temperature/timer
Interface, acoustic
Forceps
Drier, Freeze
Stand, support
Oscilloscope, variable persistance (VPO)
Insufflators, air
Computer, analog
Computer, word processing
Bridge, compression breast
Applicators
Analyzer, multichannel
Board, breast
Block, bite
Scaler
Generator, Tin113-Indium113m
Scanner, A-mode
Device, beam direction
Vial, anticoagulant
Sensitometer
Monitor, electrocardiogram
Treatment machine, linear accelerator
Treatment plan
Splints
Collimator, split beam auxiliary
Charts, radiopaque
Collar, lead (brain scanning)
Scanner, computerized tomography (CT)
Water filled test object with reflector
Cartridges, roll film
Machine, external beam treatment
Monitor, TLD

Tool/Equipment (cont.)

Tray, carousel (and projector)
Photorecorder
Lights, side
Scanner, multi-crystal
Films, potal
Level
Box, penis-holding
Ratemeter, portable dose (Cutie Pie)
Film, camera
Tray, blocking
Converter, scan
Wire
Display, real-time
Hydrometer
Device, electronic gray scale
Dectector, Doppler ultrasonic motion
Spectrometer, well and probe
Molds, styrofoam
Machine, vacuum
Cast
Simulator
Tool, cutting
Recorder, magnetic tape
Film, x-ray
Camera, multicrystal gamma
Bags, rice
Paper, contour
Sterilization indicator
Cover, waterproof table
Treatment machine, cobalt
Shields, eye
Holder, cassette
Contour
Ratemeter, digital
Bandages, fast setting resin plaster of paris
Processor, Polaroid film
Template, cutting
Pointer, back
Film, transparent
Solution, Antiseptic/sterile eye
Compensator, tissue
Camera, 35 MM
Pipette
Compulator, O.B.
Counters, proportional
Localizer, cervical
Pad, eye
Cast, positive
Plate, plastic
Centrifuge, hematocrit

Tool/Equipment (cont.)

Stock, lead
Centrifuge, standard
Scanner, emmission computerized tomography (ECT)
Stent
Scanner, rectilinear
Processor, manual x-ray film
Converters, analog scan
Cutter, hot-wire
Indicator, beam angle
Cross, metal
Chromatograph, thin layer (TLC)
Oscilloscope, standard
Device, strip chart record
Tube, capillary
Object, plexiglass test
Computer, analytical
Material, polyethylene coating
Camera, multiplane longitudinal scanning
Board, mantle
Paper, chromatography
Bandage, plaster of paris
Tube, evacuated
Bridge, blocking
Plate, beam block diagram
Tubes, dose monitoring
Bath, ultrasonic
Pipette, automatic
Camera, 70 MM
Ladle, melting
Holder, beam accessory
Probes, vaginal
Bath, boiling water
Tubes, nylon
Device, rod
Cap, rubber bathing
Hood, Fume
Shell
Mold, box
Drill
EKG Machine
Generator, Mo99-Tc99m
Scanner, multi-detector tomographic
Meter, ph
Lancet, sterile
Plotter, contour
Tool, soldering
Oven
Plate, wire
Chromatograph, gel-column
Generator, 82Sr-82mRb

Tool/Equipment (cont.)

Spectrophotometer
Column, chromatographic
Wax, resin
Periscope
Inclinometer, rolling ball
Board, esophagus
Incubator
Films, beam
Detectors, semi-conductor
Spirometer
Panel, afterloader control
Coater, photograph print
Generator, 137Cs-137mBa
Camera, positron
Oven, hot air
Generator, x-ray
Filer, millipore
Generator, 81Rb-81mKr
Generator, d.c. voltage
Generator, 141Os-191mIr
Shell, whole body
Bactec 225
Bardex
Basin, emesis
Beeper (pager)
Blender, barium
Box, needle disposal
Camera, 100mm
Cart, special procedure
Cassette, graduated filter
Charts, technique
Cleaner, intensifing screen
Clothes, surgery
Collimators, scintillation camera
Cufflator, bardex
Densitometer, bone
Developer, Xeroradiographic
Device, "beam on" warning
Dispenser, antiseptic wash
Dunce, positioning sandbag
Dunce, positioning sponge
Equipment, light cast immobilization
Equipment, radiotherapy calibration
Holder, head (Cervical Myelogram)
Holder, knee (Arthiogram)
Lead, Black's custom
Lead, Black's loose
Machine, Ortho voltage treatment
Markers, lead
Markers, nipple

Tool/Equipment (cont.)

- Mover, smooth (patient transport aid)
- Pan, bed
- Pillow
- Pizzo-Stat (child holder)
- Plates, Xeroradiographic
- Pot, Cerrobend melting
- Probe, uptake (thyroid)
- Processor, Xeroradiographic
- Restraints
- Shields, lead (syringe)
- Sink
- Spirometer, Xeon ventilation
- Sponges, radiolucent
- Stool, step
- Tape
- Television, closed circuit
- Tourniquet
- Tray, BB magnification
- Tray, block
- Unit, superficial x-ray
- Vacuum, cleaner (dustbuster)
- Vau (auto)
- Vortexer

APPENDIX D

BIBLIOGRAPHY

1. Abrams, H. (1982). Abrams angiography: Vascular and interventional radiograph (3rd ed.). Boston, MA: Little, Brown and Company.

2. Abrams, H. (1983). Coronary arteriography. Boston, MA: Little, Brown and Company.

3. Allen, H, Goldberg, S., & Sahn, D. (1978). Workbook in pediatric echocardiography. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

4. Alpert, J., & Wittenburg, S. (1986). Clinicians companion: A study guide for effective and human patient care. Boston, MA: Little, Brown and Company.

5. Amenta, M., & Bohnet, N. (1986). Nursing care of the terminally ill. Boston, MA: Little, Brown and Company.

6. American Red Cross. (1981). Standard first aid and personal safety. Washington, DC: Library of Congress.

7. Ansell, G. (1986). Notes on radiological emergencies (3rd ed.). Boston, MA: Blackwell Scientific Publications Ltd.

8. Ansell, G., & Wilkins, R. (1987). Compications in diagnostic imaging. Boston, MA: Blackwell Scientific Publications Ltd.

9. Armstrong, P., & Wastie, M. (1986). Diagnostic imaging. Boston, MA: Blackwell Scientific Publications Ltd.

10. Association of Pediatric Oncology Nurses. (1986). Nursing care of the child with cancer. Boston, MA: Little, Brown and Company.

11. Athey, P., & Hadlock, F. (1985). Ultrasound in obstetrics and gynecology (2nd ed.). St. Louis, MO: C.V. Mosby Company.

12. Athey, P., & McClendon, L. (1984). Diagnostic Ultrasound for radiographers. St. Louis, MO: C.V. Mosby Company.

13. Ballinger, P. (1985). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

14. Ballinger, P. (1986). Merrill's atlas of radiographic positions and radiologic procedures. St. Louis, MO: C.V. Mosby Company.

15. Ballon, S. (1981). Gynecologic oncology: Controversies in cancer treatment. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

16. Ball, J., & Moore, A. (1986). Essential physics for radiographers. Boston, MA: Blackwell Scientific Publications Ltd.

17. Barnett, E., & Morley, P. (1986). Clinical diagnostic ultrasound. Boston, MA: Blackwell Scientific Publications Ltd.

18. Bartram, C., & Kumar, P. (1981). Clinical radiology in gastroenterology. Boston, MA: Blackwell Scientific Publications Ltd.

19. Bartrum, R., & Harte C. (1983). Real-time ultrasound: A manual for physicians and techmical personal. Philadephia, PA: W.B. Sanders.

20. Bassett, L. (1980). Mammography, thermography, and ultrasound breast cancer detection. Orlando, FL: Grune and Stratton.

21. Bell, R., & Brown, D. (1982). 1001 Questions about diagnostic medical sonography. Cleveland, OH: University Park Press.

22. Bennett, M., & Cambell, S. (1980). Real-time ultrasound in obstetrics. Boston, MA: Blackwell Scientific Publications Ltd.

23. Bergeron, T., Osborn, G., & Som, P. (1983). Head and neck imaging. St. Louis, MO: C.V. Mosby Company.

24. Bernier, D., Langan, K., & Wells, D. (1981). Nuclear medicine technology and techniques. St. Louis, MO: C.V. Mosby Company.

25. Billinghurst, M., & Fritzberg, A. (1981). Chemistry for nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

26. Bleck, E. (1974). Atlas of plaster cast techniques (2nd ed.). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

27. Bloomfield, J. (1982). Pathology for radiographer and allied health professionals. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

28. Bontrager, K., & Anthony, B. (1983). Radiographic anatomy and positioning series (units 1-21). St. Louis, MO: C.V. Mosby Company.

29. Bontrager, K., & Anthony, B. (1987). Textbook of radiographic positioning and related anatomy. St. Louis, MO: C.V. Mosby Company.

30. Bontrager, M., Taylor, R., & Renne, R. (1975). Introduction to x-ray physics and techniques (lessons 1-4). St. Louis, MO: C.V. Mosby Company.

31. Bouchard, E. (1983). Radiology management: An introduction. St. Louis, MO: C.V. Mosby Company.

32. Bowerman, R. (1986). Atlas of normal fetal ultrasonographic anatomy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

33. Brady, L. (1980). Radiation sensitizers: Their use in the clinical management of cancer. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

34. Bragg, D., & Associate Editors. (1985). The 1985 year book of diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

35. Bragg, D., & Associate Editors. (1986). The 1986 year book of diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

36. Brascho, Donn J., & Shawker, Thomas. (1980). Abdominal ultrasound in the cancer patient. New York, NY: John Wiley and Sons, Inc.

37. Braun, H., & Cheney F. (1980). Introduction to respiratory physiology (2nd ed.). Boston, MA: Little, Brown and Company.

38. Brooks, S., Paynton Brooks, N., & Pelletier, L. (1980). Handbook of infectious diseases (2nd ed.). Boston, MA: Little, Brown and Company.

39. Burchiel, S., Rhodes, B., & Friedman, B. (1981). Tumor imaging: The radioimmun chemical detection of cancer. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

40. Bushong, S. (1984). Radiologic science for technologists: Physics, biology and protection (3rd ed.). St. Louis, MO: C.V. Mosby Company.

41. Bushong, S. (1984). Radiologic science: Workbook and laboratory manual (3rd ed.). St. Louis, MO: C.V. Mosby Company.

42. Carcio, H. (1985). Manual of health assessment. Boston, MA: Little, Brown and Company.

43. Caroline, N. (1987). Answer book for workbook in emergency medical treatment (2nd ed.). Boston, MA: Little, Brown & Company.

44. Caroline, N. (1987). Emergency medical treatment. Boston, MA: Little, Brown and Company.

45. Caroline, N. (1987). Instructor's manual for emergency medical treatment. Boston, MA: Little, Brown and Company.

46. Caroline, N. (1987). Workbook for emergency medical treatment (3rd ed.). Boston, MA: Little, Brown and Company.

47. Caroline, N. (1987). Emergency medical treatment (2nd ed.). Boston, MA: Little, Brown and Company.

48. Carson, P. (1978). Interaction of ultrasound in tissues [Slide set]. Garden Grove, CA: Medcom, Inc.

49. Carter, B., et al. (1977). Cross sectional anatomy: Computered tomography and ultrasound correlation. East Norwalk, CT: Appleton.

50. Casciato, D., & Lowitz, B. (1987). Manual of bedside oncology (2nd ed.). Boston, MA: Little, Brown and Company.

51. Caughill, R. (1976). The dying patient: A supportive approach. Boston, MA: Little, Brown and Company.

52. Chang, S. (1982). Echocardiography: Techniques and interpretion (2nd ed.). Philadephia,PA: Lea and Febiger.

53. Chesney, D. (1976). Radiographic anatomy of the chest and abdomen. Boston, MA: Blackwell Scientific Publications Ltd.

54. Chesney, D. (1986). A radiographer's handbook of hospital. Boston, MA: Blackwell Scientific Publications Ltd.

55. Chesney, D., & Chesney M. (1984). X-ray equipment for student radiographers. Boston, MA: Blackwell Scientific Publications Ltd.

56. Chesney, D., & Chesney, M. (1981). Radiographic imaging (4th ed.). Boston, MA: Blackwell Scientific Publications Ltd.

57. Chesney, D., & Chesney, M. (1986). Care of the patient in diagnostic radiography. Boston, MA: Blackwell Scientific Publications Ltd.

58. Christensen, Charles. (1979). Christensen radiography series (lessons 1-6). St. Louis, MO: C.V. Mosby Company.

59. Cinefo, R. (1983). Ophthalmic ultrasound [Slide set]. Garden Grove, CA: Medcom, Inc.

60. Cosgrove, D., & McCready, R. (1980). Ultrasound imaging: Liver, spleen, pancreas. New York, NY: John Wiley and Sons, Inc.

61. Coyle, G., Bontrager, K., & Anthony, B. (1977). Radiographing immobile trauma patients (lessons 1-7). St. Louis, MO: C.V. Mosby Company.

62. Croft, B. (1986). Single-proton emission computed tomography. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

63. Cusworth, Rita. (1983). Quality assurance in diagnostic radiology: An eight-step methodology (lessons 1-3). St. Louis, MO: C.V. Mosby Company.

64. Daves, M. (1981). Cardiac roentgenology: Shadows of the heart. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

65. DeAngelis, C. (1984). Pediatric primary care (3rd ed.). Boston, MA: Little, Brown and Company.

66. Dean, M., & West, T. (1975). Basic anatomy and physiology for radiographers. Boston, MA: Blackwell Scientific Publications Ltd.

67. Dendy, P., & Heaton, B. (1986). Physics for radiologists. Boston, MA: Blackwell Scientific Publications Ltd.

68. Department of Radiology. Diagnostic ultrasonography IV. San Francisco, CA: University of California.

69. Department of Radiology. Diagnostic ultrasonography series III. San Francisco, CA: University of California.

70. Department of Radiology. Diagnostic ultrasonography series V. San Francisco, CA: University of California.

71. Department of Radiology. OB GYN ultrasonography series I. San Francisco, CA: University of California.

72. Department of Radiology. (1980). B-Mode and real-time sonography series [Video]. San Francisco, CA: University of California.

73. DeSmet, A. (1985). Radiology of spinial curvature. St. Louis, MO: C.V. Mosby Company.

74. Early, P., & Sodee, B. (1984). Principles and practices of nuclear medicine. St. louis, MO: C.V. Mosby Company.

75. Eckert, C. (1981). Emergency-room care (4th ed.). Boston, MA: Little, Brown and Company.

76. Edmond, R. (1974). Infectious disease color atlas. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

77. Ehrlich, R., McCloskey, E., & Kruse, R. (1985). Patient care in radiography. St. Louis, MO: C.V. Mosby Company.

78. Eiken, M. (1979). Roentgen diagnosis of children. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

79. Elkins, M. (1980). Radiology of the urinary system. Boston, MA: Little, Brown and Company.

80. Ell, P., & Williams, E. (1981). Nuclear medicine: An introductory text. Boston, MA: Blackwell Scientific Publications Ltd.

81. Evans, K., & Knight, B. (1981). Forensic radiology. Boston, MA: Blackwell Scientific Publications Ltd.

82. Faerber, E. (1986). Cranial computed tomography in infants and children. Boston, MA: Blackwell Scientific Publications Ltd.

83. Feigenbaum, H. (1981). Echocardiography (3rd ed.). Philadelphia, PA: Lea and Febiger.

84. Ferguson, M., & Bohr, P. (1984). Living anatomy laboratory manual. St. Louis, MO: C.V. Mosby Company.

85. Fischer, D., & Marsh, J. (1982). Cancer therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

86. Fleishcher, A., & Everette, J. (1980). Introduction to diagnostic sonography. New York, NY: John Wiley and Sons, Inc.

87. Frick, M., & Feinberg, S. (1986). Abdominal imaging: An introduction. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

88. Friedmann, G., Wentz, W., Ebel, K., & Bucheler, E. (1980). Emergency roentgen diagnosis. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

89. Frik, W., & Goering, U. (1980). Roentgenologic anatomy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

90. Gammills, S. (1977). A progrmed introduction to upper gastrointestinal radiology. Boston, MA: Little, Brown and Company.

91. Gill, F., & Ashton, I. (1982). Monitoring for health hazards at work. Boston, MA: Blackwell Scientific Publications Ltd.

92. Goldberg, B. (1977). Gray scale ultrasonography [Slide set]. Garden Grove, CA: Medcom, Inc.

93. Goldberg, H., Higgins, C., & Ring, E. (1985). Contemporary imaging: Magnetic resonance imaging, computed tomograpy, and interventional radiology. St. Louis, MO: C.V. Vosby Company.

94. Goldberg, S., Allen, H., & Sahn, D. (1980). Pediatric and adolescent echocardiography. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

95. Grech, P. (1981). Casualty radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

96. Greenbaum, E. (1980). Radiograpic atlas of colon disease. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

97. Green, J. (1983). Medical oncology pocket consultant. Boston, MA: Blackwell Scientific Publications Ltd.

98. Gurley, L., & Callaway, W. (1986). Introduction to radiologic technology (2nd ed.). St. Louis, MO: C.V. Mosby Company.

99. Gyll, C. (1985). A handbook of paediatric radiology. Boston, MA: Blackwell Scientific Publications Ltd.

100. Haaga, J., & Alfidi, R. (1984). Computed tomography of the brain, head and neck. St. Louis, MO: C.V. Mosby Company.

101. Haaga, J., & Alfidi. (1983). Computed tomography of the whole body. St. Louis, MO: C.V. Mosby Company.

102. Haaga, J., & Alfid, R. (1984). Computed tomography of the abdomen. St. Louis, MO: C.V. Mosby Company.

103. Hagan, A., DiSessa, T., Bloor, C., & Calleja, H. (1983). Two-Dimensional echocardiography: Cliniacl and pathological correlations in adolescent and adult heart disease. Boston, MA: Little, Brown and Company.

104. Hagen, S., & Teichman, E. (1980). Textbook of diagnostic ultrasonography. St. Louis, MO: C.V. Mosby Company.

105. Hagen-Ansert, S. (1983). Textbook of diagnostic ultrasonography (2nd ed.). St. Louis, MO: C.V. Mosby Company.

106. Haller, J. (1980). Pediatric ultrasound series (parts 1, 2, and 3). Garden Grove, CA: Medcom, Inc.

107. Haller, J., & Schneider, M. (1980). Pediatric ultrasound. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

108. Haller, J., & Slovis, T. (1984). Introduction to radiology in clinical pediatrics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

109. Hanafee, W., Lufkin, R., & Raschning, W. (1987). Magnetic resonance imaging. St. Louis, MO: C.V. Mosby Company.

110. Harper, P. (1983). Ultrasound mammography. Cleveland, OH: University Park Press.

111. Heindel, N., Burns, H., Honda, T., & Brady, L. (1978). The chemistry of radiopharmaceutials. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

112. Hein, E., & Nicholson, M. (1982). Comtemporary leadership behavior: Selected readings. Boston, MA: Little, Brown and Company.

113. Heitzman, R. (1984). The lung: Radiologic-pathologic collelations. St. Louis, MO: C.V. Mosby Company.

114. Hendee, W. (1979). Medical radiation physics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

115. Hendee, W. (1981). Radiation therapy physics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

116. Hendee, W. (1983). The physical priciples of computed tomography. Boston, MA: Little, Brown and Company.

117. Hendree, W., & Morgan, C. (1984). Introduction to magnetic resonane imaging. St. Louis, MO: C.V. Mosby Company.

118. Hickey, R., Clark, R., & Cumley, R. (1985). The 1985 yearbook of cancer. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

119. Hickey, R., Clark, R., & Cumley, R. (1986). The 1986 yearbook of cancer. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

120. Hill, C., McCready, V., & Cosgrove, D. (1979). Ultrasound in tumor diagnosis. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

121. Hobbins, J. (1982). Ultrasonography in obstetrics and genecology (2nd ed.). Baltimore, MD: Williams and Wilkins.

122. Hoffer, P., & Associate Editors. (1985). The 1985 year book of nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

123. Hoffer, P., & Associate Editors. (1986). 1986 Yearbook of nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

124. Holman, L., & Parker, A. (1981). Computer-assisted cardiac nuclear medicine. Boston, MA: Little, Brown and Company.

125. Holm, H., & Kristensen, J. (1980). Abdominal ultrasound. Cleveland, OH: University Park Press.

126. Howland, W., & Carlon, G. (1985). Management of the critically iII cancer patient. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

127. James, T., & Margulis, A. (1984). Biomedical magnetic resonance. St. Louis, MO: C.V. Mosby Company.

128. Jenkins, J., & Loscalzo, J. (1986). Manual of emergency medicine. Boston, MA: Little, Brown and Company.

129. Johnsrude, I., & Jackson, O. (1987). A practical approach to angiography (2nd ed.). Boston, MA: Little, Brown and Company.

130. Judge, R., Zuidema, G., & Fitzgerald, F. (1982). Clinical diagnosis: A physiologic approach (4th ed.). Boston, MA: Little, Brown and Company.

131. Kangarloo, H., & Sample F. (1980). Ultrasound of the pediatric abdomen and pelvis. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

132. Kartha, P., & Thompson, P. (1982). Dosimetry workbook. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

133. Keats, T. (1984). Atlas of normal roentgen variants that may simulate diseases. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

134. Keats, T. (1984). Emergency radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

135. Keats, T., & Lusted, L. (1985). Atlas of roentgenographic measurements. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

136. Kilcoyne, R. (1986). Handbook of radiologic orthopaedic terminology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

137. Kirby, R. (1986). Respiratory failure. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

138. Kirks, D. (1984). Practical pediatric imaging. Boston, MA: Little, Brown and Company.

139. Kitchen. I. (1984). Textbook of in vitro practical pharmacology. Boston, MA: Blackwell Scientific Publications Ltd.

140. Kleid, J. (1978). Echocardiogrqphy: Interpretation and diagnosis. East Norwalk, CT: Appleton.

141. Klippel, A., & Anderson, C. (1979). Manual of emergency and outpatient techniques. Boston, MA: Little, Brown and Company.

142. Kobayaski, M. (1980). Ultrasonography in ostetrics and gynecology (2nd ed.). New York, NY: Igaku-Shoin.

143. Kramer, D. (1982). Medical practice management. Boston, MA: Little, Brown and Company.

144. Kreel, L. (1980). Clark's positioning in radiography (Vols. 1 & 2). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

145. Kreel, L., & Steiner, E. (1979). Medical imaging. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

146. Kremkau, F. (1980). Diagnostic ultrasound. Orlando, FL: Grune and Stratton.

147. Kruger, R., & Riederer, S. (1984). Basic concepts of ditial subtraction angiography. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

148. Kuhns, L. (1983). Atlas of computed tomography variants. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

149. Kuni, C., & Klingensmith, W. (1983). Atlas of radionuclide hepatobiliary imaging. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

150. Latchaw, R. (1985). Computed tomography of the head, neck, and spine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

151. Lawson, T. (1979). Ultrasonic diagnosis of ectopic pregnancy [Slide set]. Garden Grove, CA: Medcom, Inc.

152. Lees, W. (1987). Abdominal ultrasonography. Boston, MA: Blackwell Scientific Publications Ltd.

153. Leonard, William. (1984). Mosby's rad-tech assesstest. St. Louis, MO: C.V. Mosby Company.

154. Levene, M. (1984). Ultrasound of the infant brain. Boston, MA: Blackwell Scientific Publications Ltd.

155. Levy, B., & Wegman, D. (1982). Occupational health: Recognizing and preventing work-related diseases. Boston, MA: Little, Brown and Company.

156. Levy, R., Hawkins, H., & Barsan, W. (1986). Radiology in emergency medicine. St. Louis, MO: C.V. Mosby Company.

157. Lochhead, J. (1983). Care of the patient in radiotherapy. Boston, MA: Blackwell Scientific Publications Ltd.

158. Logan, W., & Muntz, P. (1979). Reduced dose mammography. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

159. Lokich, J. (1978). Primer of cancer management. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

160. Mandell, L., & Ralph, E. (1985). Essentials of infectious diseases. Boston, MA: Blackwell Scientific Publications Ltd.

161. Margulis, A., & Burhenne, J. (1982). Alimentary tract radiology. St. Louis, MO: C.V. Mosby Company.

162. Margulis, A., & Gooding, C. (1984). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.

163. Margulis, A., & Gooding, C. (1985). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.

164. Margulis, A., & Gooding, C. (1986). Diagnostic radiology. St. Louis, MO: C.V. Mosby Company.

165. Margulis, A., Higgins, C., Kaufman, L., & Crooks, L. (1984). Clinical magnetic resonance imaging. St. Louis, MO: C.V. Mosby Company.

166. Maue-Dickson, W., Dickson, D., & Pullen, F. (1983). Computed tomographic atlas of the head and neck. Boston, MA: Little, Brown and Company.

167. McDicken, W. N. (1981). Diagnostic ultransonics (2nd ed.). New York, NY: John Wiley and Sons, Inc.

168. McLemore, J. (1981). Quality assurance in diagnostic radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

169. McMinn, R., Hutchings, R., & Logan, B. (1984). Applied anatomy coor atlas. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

170. McNeil, B., & Abrams, H. (1985). Brigham and women's hospital handbook of diagnostic imaging. Boston, MA: Little, Brown and Company.

171. Megibow, A., & Balthazar, J. (1986). Comuted tomography of the gastvointestinal tract. St. Louis, MO: Mosby Company.

172. Mendelson, R., & Whitehouse, G. (1986). Self-assessment in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.

173. Metrewell, C. (1979). Practical abdominal ultrasound. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

174. Meyer, R. (1977). Pediatric echocardiography. Philadelphia, PA: Lea and Febiger.

175. Miller, S. (1984). Cardiac angiography. Boston, MA: Little, Brown and Company.

176. Mintz, G. (1986). Diagnostic cardiac ultrasound. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

177. Mistretta, C., Crummy, A., Strother, C., & Sackett, J. (1981). Digital subtraction anteriography: An application of computerized fluoroscopy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

178. Montagne, J., Chevrot, A., & Galmiche, J. (1981). Atlas of foot radiology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

179. Morley, P., et al. (1983). Ultrasonic sectional anatomy. New York, NY: Churchill Livingstone.

180. Moss, A., & Goldberg, H. (1979). Computed tomgraphy, ultrasound and x-ray. New York, NY: Masson Publishing USA, Inc.

181. Moss, A., Rin, E., & Higgins, C. (1986). NMR, CT and interventional radiology. St. Louis, MO: C.V. Mosby Company.

182. Moss, W., Brand, W., & Battifora, H. (1979). *Radiation oncology: Rationale, technique, results* (5th ed.). St. Louis, MO: C.V. Mosby Company.

183. Moss, W., & Cox, J. (1987). *Radiation oncology: Rationale, technique, results* (6th ed.). St. Louis, MO: C.V. Mosby Company.

184. Naggar, C. (1982). *Two-Dimensional echocardiography series* [Slide set]. Garden Grove, CA: Medcom, Inc.

185. Nahum, H., Fekete, F., & Margulis, A. (1979). *Radiology of the postoperative digestive tract*. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

186. Nasser, F., & Giulliani, E. (1983). *Clinical two-dimensional echocardiography*. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

187. Neelon, F., & Ellis, G. (1975). *A syllabus of problem-oriented patient care*. Boston, MA: Little, Brown and Company.

188. Novelline, R., & Squire, L. (1986). *Living anatomy: A workbook using computed tomography, magnetic resonance, and angiography*. St. Louis, MO: C.V. Mosby Company.

189. Oh, K., Ledesma-Medina, J., & Bender, T. (1982). *Practical gamuts and differential diagnosis in pediatric radiology*. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

190. Omoto, R., & Kobayashi, M. (1981). *Atlas of essential ultrasound imaging*. New York, NY: Igaku-Shoin.

191. Park, W., & Hughes, S. (1987). *Orthopaedic radiology*. Boston, MA: Blackwell Scientific Publications Ltd.

192. Perimam, P. (1983). *Management of advanced cancer*. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

193. Peyster, R., & Hoover, E. (1986). *Computed tomography of the brain and spine: An atlas*. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

194. Phelps, P., & Lloyd, G. (1983). *Radiology of the ear*. Boston, MA: Blackwell Scientific Publications Ltd.

195. Phillips, M. (1987). *Ensuring image quality*. St. Louis, MO: C.V. Mosby Company.

196. Phost, G., Higgins, C., Morganroth, J., Ritchie, J., & Heinrich, R. (1986). New concepts in cardiac imaging 1986. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

197. Phost, G., Higgins, C., Morganroth, J., Ritchie, J., & Heinrich, R. (1987). New concepts in cardiac imaging 1987. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

198. Pilapil, F., & Studua, K. (1979). Programmed instruction: Radiation therapy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

199. Plumer, A. (1987). Principles and practice of intravenous therapy (4th ed.). Boston, MA: Little, Brown and Company.

200. Portlock, C., & Goffinet, D. (1986). Manual of clinical problem in oncology (2nd ed.). Boston, MA: Little, Brown and Company.

201. Post, J. (1980). Radiographic evaluation of the spine: Current advances with emphasis on cumputed tomography. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

202. Rabinov, K., & Weber, A. (1985). Radiology of the salivary glands. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

203. Rau, J., & Peavee, D. (1984). Understanding chest radiographs. St. Louis, MO: C.V. Mosby Company.

204. Reed, J. (1986). Chest radiology: Patterns and differential diagnosis. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

205. Regato, J., Spjut, H., & Cox, J. (1984). Ackevman and del regato's cancer: Diagnosis, treatment and prognosis (6th ed.). St. Louis, MO: C.V. Mosby Company.

206. Riegelman, R. (1981). Studying a study and testing a test: How to read the medical literature. Boston, MA: Little, Brown and Company.

207. Riegelman, R. (1987). Putting prevention into practice. Boston, MA: Little, Brown and Company.

208. Ring, E., & McLean, G. (1987). Interventional radiology: Principles and techniques. Boston, MA: Little, Brown and Company.

209. Ritenour, R., & Hendee, W. (1983). Computer applications in diagnostic radiology (lessons 1-3). St. Louis, MO: C.V. Mosby Company.

210. Ritenour, R., & Hendee, W. (1983). Radiation protection and biology (lessons 1-5). St. Louis, MO: C.V. Mosby Company.

211. Ritenour, R., & Hendee, W. (1985). Principles of magnetic resonance imaging (lessons 1-2). St. Louis, MO: C.V. Mosby Company.

212. Ritenour, R., Hendee, W., & Bontrager, K. (1984). The radiation physics series (lessons 1-7). St. Louis, MO: C.V. Mosby Company.

213. Robert, D. (1983). Imaging in heptobillary disease. St. Louis, MO: C.V. Mosby Company.

214. Roberts, K. (1985). Manual of clinical problems in pediatrics (2nd ed.). Boston, MA: Little, Brown and Company.

215. Rose, J. (1983). Invasive radiology: Risks and patient care. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

216. Rose, J., & Goldberg, B. (1979). Basic physics in diagnostic ultrasound. New York, NY: John Wiley and Sons, Inc.

217. Ryo, V., Pinsky, S., & Bekerman, C. (1985). Atlas of nuclear medicine artifacts and variants. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

218. Sabbagha, R. (1979). Ultrasound in high-risk obstetics. Philadelphia, PA: Lea and Febiger.

219. Salm, T., Cutler, B., & Wheeler H. (1987). Atlas of bedside procedures (2nd ed.). Boston, MA: Little, Brown and Company.

220. Sanders, R. (1978). Diagnostic ultrasound in obstetrics and genecology (part 1) [Slide set]. Garden Grove, CA: Medcom, Inc.

221. Sanders, R. (1978). Measurement data in obstetrical ultrasound [Slide set]. Garden Grove, CA: Medcom, Inc.

222. Sanders, R. (1979). Diagnostic ultrasound in obstetrics and genecology (part 2) [Slide set]. Garden Grove, CA: Medcom, Inc.

223. Sanders, R. (1982). Ultrasonic evaluation of the gallbladder and biliary tract [Slide set]. Garden Grove, CA: Medcom, Inc.

224. Sanders, R. (1984). Clinical Sonography: a practicle guide. Boston, MA: Little, Brown and Company.

225. Sanders, R. (1986). Atlas of ultrasonographic variants and artifacts. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

226. Sanders, R., & Everette, J. (1980). The principles and practice of ultrasound in obstetrics and gynecology (2nd ed.). East Norwalk, CT: Appleton.

227. Sanders, R., & Rifkin, M. (1981). Ultrasonic evaluation of the kidney [Slide set]. Garden Grove, CA: Medcom, Inc.

228. Sarti, D. (1980). Obstetric and gynecologic ultrasound. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

229. Sarti, D. (1982). Atlas of obstetric and gynecologic ultrasound. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

230. Sarti, D. (1986). Diagnostic ultrasound: Text and cases. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

231. Sarti, D., & Sample, F. (1980). Diagnostic ultrasound. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

232. Schaffer, R. (1983). Self-Assessment in diagnostic ultrasound (parts 1 & 2) [Slide set]. Garden Grove, CA: Medcom, Inc.

233. Scott, W., & Scott, P. (1985). Consultation in diagnostic imaging: Medical consultant series. St. Louis, MO: C.V. Mosby Company.

234. Scoy-Mosher, M. (1981). Medical oncology: Controversies in cancer treatment. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

235. Shamanshy, S., Cecere, C., & Shellenberger, E. (1984). Primary health care handbook: Guideline for patient education. Boston, MA: Little, Brown and Company.

236. Shammas, J. (1984). Atlas of ophthalmic ultrasonography and biometry. St. Louis, MO: C.V. Mosby Company.

237. Shapiro, R. (1980). Radiology of the normal skull. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

238. Shapiro, R. (1984). Myelography (4th ed.). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

239. Shepherd, J., & Monaghan, J. (1985). Clinical gynaecological oncology. Boston, MA: Blackwell Scientific Publications Ltd.

240. Sherwood, T. (1980). Uroradiology. Boston, MA: Blackwell Scientific Publications Ltd.

241. Shirkhoda, A., & Charnsangavej, A. (1986). Atlas of radiologic oncololgy of the abdomen. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

242. Siddigui, A. (1985). Nuclear imaging in pediatrics. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

243. Siegle, R. (1986). Imaging in internal medicine. Boston, MA: Little, Brown and Company.

244. Sigel, B. (1982). Operatice ultrasound. Philadelphia, PN: Lea and Febiger.

245. Silverman, F. (1985). Caffey's pediatric x-ray dianosis: An integrated imaging approach (8th ed.). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

246. Skeet, M. (1987). Emergency procedures and first aid for nurses. Boston, MA: Blackwell Scientific Publications Ltd.

247. Snell, R. (1978). Atlas of clinical anatomy. Boston, MA: Little, Brown and Company.

248. Snell, R. (1986). Clinical anatomy for medical students. Boston, MA: Little, Brown and Company.

249. Snell, R., & Wyman, A. (1976). An atlas of normal radiographic anatomy. Boston, MA: Little, Brown and Company.

250. Snyder, C. (1985). Textbook of oncology nursing. Boston, MA: Little, Brown and Company.

251. Solvis, T. (1982). Neurosonography in neonates (parts 1 & 2) [Slide set]. Garden Grove, CA: Medcom, Inc.

252. Souhami, R., & Tobias, J. (1986). Cancer and its management. Boston, MA: Blackwell Scientific Publications Ltd.

253. Stark, D., & Bradley, W. (1987). Magnetic resonance imaging. St. Louis, MO: C.V. Mosby Company.

254. Starling, L., & Stellitano, L. (1987). Medical secretaries handbook. Boston, MA: Blackwell Scientific Publications Ltd.

255. Statkiewicz, M., & Ritneour, R. (1983). Radiation protection for student radiographers. St. Louis, MO: C.V. Mosby Company.

256. Stevens, M., & Phillips, R. (1983). Comprehensive review for the radiologic technologist (4th ed.). St. Louis, MO: C.V. Mosby Company.

257. Stone, L. (1978). Current perspectives in obstetrical and fetal ultrasonography [Slide set]. Garden Grove, CA: Medcom, Inc.

258. Straub, W. (1984). Manual of diagnostic imaging: A clinician's guide to clinical problem solving. Boston, MA: Little, Brown and Company.

259. Sutton, M., & Oldershaw, P. (1987). Textbook of echocardiography. Boston, MA: Blackwell Scientific Publications.

260. Talano, J., & Gardin, J. (1983). Textbook of two-dimensional echocardiography. Orlando, FL: Grune and Stratton.

261. Taybi, H. (1982). Radiology of syndromes and metabolic disorders (2nd ed.). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

262. Taylor, K. (1981). Ultrasound in emergency medicine: Clinics in diagnostic ultrasound (Vol. 7). New York, NY: Churchill Livingstone, Inc.

263. Tebbi, C. (1982). Major topics in pediatric adolescent oncology. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

264. Thompson, T. (1980). A practical approach to modern imaging equipment (2nd ed.). Boston, MA: Little, Brown and Company.

265. Thompson, T. (1980). Primer of clinical radiology. Boston, MA: Little, Brown and Company.

266. Thrall, J., & Swanson, D. (1985). Diagnostic interventions in nuclear medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

267. Tortorici, M. (1982). Fundamentals of angiography. St. Louis, MO: C.V. Mosby Company.

268. Tortorici, M., & Hunt, H. (1984). Radiation physics laboratory manual. St. Louis, MO: C.V. Mosby Company.

269. Troupin, R. (1985). Diagnostic imaging in clinical medicine. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

270. U.S. Department of Labor. (1977). Fields related to radiology: Tasks in radiation therapy and diagnostic ultrasound. Springfield, VA: National Technical Information Service.

271. Vanders, S., Thomas, J., Cutler, B., & Wheeler, H. (1987). Atlas of bedside procedures. Boston, MA: Little, Brown and Company.

272. Vicente, J., Cortes-Funes, H., Viladiu, P., & Muggia, F. (1980). Clinical oncology: The foundation of current patient management (and selected therapeutic developments). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

273. Wahner, H. (1983). Nuclear medicine: Selected quantitative procedures. Boston, MA: Little, Brown and Company.

274. Wallach, J. (1986). Interpretation of diagnostic tests. Boston, MA: Little, Brown and Company.

275. Walshe, T. (1984). Manual of clinical problems in geriatrics. Boston, MA: Little, Brown and Company.

276. Weill, F. (1982). Ultrasonography of digestive diseases (2nd ed.). St. Louis, MO: C.V. Mosby Company.

277. Weir, J., & Abrahams, P. (1978). An atlas of radiological anatomy. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

278. Weiss, H., & Weiss, A. (1986). Ultrasound atlas: Real-time ultrasound imaging in internal medicine. St. Louis, MO: C.V. Mosby Company.

279. Wells, D., & Bernier, D. (1980). Radionuclido imaging artifacts. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

280. Whalen, J., & Balter, S. (1984). Radiation risks in medical imaging. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

281. Whitehouse, G. (1981). Gynaecological radiology. Boston, MA: Blackwell Scientific Publications Ltd.

282. Whitehouse, G., & Worthington, B. (1983). Techniques in diagnostic radiology. Boston, MA: Blackwell Scientific Publications Ltd.

283. Wick, J. (1983). Fundementals of ultrasound techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

284. Wicks, J., & Howe, K. (1983). Fundamentals of ultrasonographic techniques. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

285. Wilkins, R., & Viamonte, M. (1982). Interventional radiology. Boston, MA: Blackwell Scientific Publications Ltd.

286. Williams, A., & Haughton, V. (1985). Cranial computed tomography: A comprehensive text. St. Louis, MO: C.V. Mosby Company.

287. Williams, R., Bierman, F., & Sanders, S. (1986). Echocardiographic diagnosis of cardiac malformations. Boston, MA: Little, Brown and Company.

288. Wilson, G., & Hanafee, G. (1984). Current radiology (Vol. 5). Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

289. Winsberg, F. (1983). Clinical ultrasound reviews (Vol. 3). New York, NY: John Wiley and Sons, Inc.

290. Wolff, S., & Associate Editors. (1986). The 1986 yearbook of infectious diseases. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

291. Wolff, S., & Associate Editors. (1987). The 1987 yearbook of infectious diseases. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

292. Wong, C., & Swazey, J. (1981). Dilemmas of Dying: Policies and procedures for decisions not to treat. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

293. Yiu-Chiu, V., & Chiu, L. (1982). Atlas of obstetrical ultrasonography. Cleveland, OH: University Park Press.

294. Yock, D. (1985). Computed tomography of cns diseases: A teaching file. Chicago, IL: Year Book Medical Publishers-Time Mirror Books.

295. Zwiebel, W. (1982). Introduction to vascular ultrasonography. Orlando, FL: Grune and Stratton.

APPENDIX D (cont.)

STATE OF THE ARTS BIBLIOGRAPHY

1. AHA Guide to Health Related Field. (1985). Chicago, IL: American Hospital Association.

2. Allied Health Education Directory. (1985). Chicago, IL: American Medical Association.

3. American Registry of Diagnostic Medical Sonographers (1986). Diagnostic Medical Sonographers Informational Booklet. ARDMS Central Office, Cincinnati, OH.

4. American Registry of Radiologic Technologists (1985). ARRT Examinee Handbook. ARRT Central Office, Minneapolis, MN.

5. American Society of Radiologic Technologists (1984). Scopes of Practice and Position Descriptions for Radiologic Technology. ASRT Central Office, Albuquerque, NM.

6. Bowling, W. and Miller, A. (1980). Occupational Outlook Information Report, 1976 - 1985. Employment and Training Administration, U.S. Department of Labor, Chicago, IL.

7. Bureau of Labor Statistics. (1985). Occupational Outlook Handbook. Washington DC: U.S. Government Printing Office.

8. Career Opportunities. (1970). (Health Related Careers). Chicago, IL: J.G. Ferguson Publishing Company.

9. Eckley, A.K. (1982). RT`s: the newest endangered species?. Diagnostic Imaging, 68, 20-21.

10. Encyclopedia of Medical Organizations and Agencies. (1982). Detroit, MI: Gale Research Company.

11. Gale, B. and Gale, L. (1979). National Career Directory. New York, NY: Arco Publishing Inc.

12. Geisler, L. (1985). A new focus on radiologic technology education. Educator, Vol. 2, No. 3:2.

13. Hopke, J. (1984). Encyclopedia of Careers and Vocational Guidance. Chicago, IL: J.G. Ferguson Publishing Company.

14. Illinois Department of Employment Security. (1982). Occupational Projections 1980-1990, State of Illinois. Chicago, IL: Research and Analysis Department.

15. Illinois Department of Labor--Bureau of Employment Security. (1986). 1982-1995 Occupational Projections. Chicago, IL: Economic Information and Analysis Division.

16. Kramer, S. (1976). The patterns of cancer care in clinical research radiation therapy. JAMA 235 (4).

17. Medical and Health Information Directory. (1980). Detroit, MI: Gale Research Company.

18. Rominger, C. and Browning, D. (1977). Radiation therapy manpower needs, problems potential-1976. International Journal of Radiation Oncology and Biological Physics, (2).

19. Rominger, C. and Browning, D. (1978). Radiation therapy manpower needs, 1977. Applied Radiology, November/December, 1977-182.

20. Rominger, C. and Browning D. et. al. (1983). Radiation therapy technology manpower needs-1982. International Journal of Radiation Oncology and Biological Physics, (9).

21. Standard Periodical Directory (1984). New York, NY: Oxbridge Communications Inc.

22. United States Department of Labor. (1985). Careers Guidebook. Washington, DC: U.S. Government Printing Office.

23. United States Department of Labor. (1977). Dictionary of Occupational Titles. Washington, DC: Employment and Training Administration.

24. United States Department of Labor. (1982, Spring). Occupational Outlook Quarterly. Washington, DC: U.S. Government Printing Office.

25. United States Department of Labor. (1985, Summer). Occupational Outlook Quarterly. Washington, DC: U.S. Government Printing office.

26. United States Department of Labor. (1977). The Technologist Function in Fields Related to Radiology: Tasks in Radiation Therapy and Diagnostic Ultrasound. Employment and Training Administration.

27. *V-TECS Catalog--Nuclear Medicine Technologist*. (1981). Baltimore, Maryland: Vocational-Technical Education Consortium of States.

28. *V-TECS Catalog--Radiographer*. (1980). Athens, Georgia: Vocational-Technical Education Consortium of States.

29. Wright, J.W. (1984). Jobs and Salaries in Health Care. *The Almanac of Jobs and Salaries*, 631-632.

PERSONAL INTERVIEWS:

1. Ann Gilbert; Health Department, Illinois Board of Education/DAVTE, Springfield, IL, 1986.

2. Dianne Underwood; Sonographer, Department of Radiology, Memorial Hospital, Carbondale, IL, 1986.

3. Dr. D. Bhate; M.D. Radiology/Ultrasound, Bethesda Regional Cancer Diagnostic and Treatment Center, Carterville, IL, 1986.

4. John Landt; Chief Technician of Radiology Department, Memorial Hospital, Carbondale, IL, 1986.

5. Steve Jenson; Allied Health Careers, Southern Illinois University, Carbondale, IL, 1986.

PHONE INTERVIEWS:

1. American Institute of Ultrasound in Medicine (AIUM), Bethesda, MD, 1986.

2. American Registry of Diagnostic Medical Sonographers (ARDMS), Cincinnati, OH, 1986).

3. American Registry of Radiologic Technologists (ARRT), Minneapolis, MN, 1986.

4. American Society of Radiologic Technologists (ASRT), Albuqueque, NM, 1986.

5. American Society of Ultrasound Technical Specialists (ASUTS), Mobile, AL, 1986.

6. Department of Allied Health Education and Accreditation, American Medical Association, Chicago, IL, 1986.

7. Illinois Department of Commerce and Community Affairs--Research Department, Springfield, IL, 1986.

8. Illinois Department of Labor--Job Service, State of Illinois, Chicago, IL, 1986.

9. Illinois Department of Labor Statistics, Springfield, IL, 1986.

10. Illinois Department of Health, Springfield, IL, 1986.

11. Illinois Hospital Association, Oakbrook, IL, 1986.

12. School of Technical Careers--Allied Health Department, Southern Illinois University, Carbondale, IL, 1986.

13. Society of Diagnostic Medical Sonographers, Dallas, TX, 1986.

14. U.S. Department of Labor--Bureau of Employment Security, Chicago, IL, 1986.

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Trade Publications:

Advanced Exercises in Diagnostic Radiology. Published by U.B. Saunders Co., Philadelphia.

American College of Radiology Bulletin. Ed. Charles Honaker, Chicago.

Canadian Association of Radiologists Journal. Ed. B. Lentle Md, Montreal.

Canadian Journal of Radiography, Radiotherapy Nuclear Medicine. Published by the Canadian Association of Medical Radiation Technologists. Ottawa.

Nuclear Medicine. Published by Futura Media Services, Mr. Kisco, NY.

Radiation Curing. Ed. Dale DeBlander. Norwalk, CN.

Radiation Therapy Newsletter. Published by the Medical Newsletter and Update Service, Marion, IL.

Radioassay News. Ed. Solomon J. Zak MD. Published by Scientific Newsletters, Inc., Anaheim

Radiographics. Published by the Radiology Dues and Subscription Dept., Easton, PA.

Radiologic Clinics of North America. Published by W.B. Saunders Co., Philadelphia.

Radiologic Technology. Published by the American Society of Radiologic Technologists, Chicago.

Radiology. Published by the Radiological Society of N.A., Inc., Oakbrook, IL

Radiology News. Ed. H. Henderson. Published by Winthrop Laboratories, New York.

Radiology/Today and Tomorrow. Published by Winthrop Laboratories, New York.

Seminars in Ultrasound, CT and MR. Grune and Stratton, Inc.

Textbooks:

Prices listed may fluctuate.

Allied Health Books Series. (1983). Diagnostic Medical Ultrasound. Medical Examination Publishing Co. 2nd Ed. $23.50.

Anderhub, B. (1983). Manual of Abdominal Ultrasonography. University Park Press. $30.00.

Athey, P., & McClendon, L. (1983). Diagnostic Ultrasound for Radiographers. Multi-Media Publishing, Inc. No price listed.

Athey, P., & Handlock, F. (1981). Ultrasound in Obstetrics and Gyneology. C.V. Mosby. $49.50.

Bartrum, R., & Harte C. (1983). Real-Time Ultrasound: A Manual for Physicians and Technical Personel, 2nd Edition. W. B. Sanders. No price listed.

Bassett, L. (1980). Mammography, Thermography, and Ultrasound Breast Cancer Detection. Grune and Stratton. $42.50.

Bell, R., & Brown, D. (1982). 1001 Questions About Diagnostic Medical Sonography. University Park Press. $9.95.

Bennett, M. J., & Cambell, S. (1980). Real-Time Ultrasound in Obstetrics. Blackwell/Mosby. $42.50.

Brascho, Donn J. and Shawker, Thomas. Abdominal Ultrasound in the Cancer Patient. John Wiley and Sons, Inc., 1980. $55.00.

Carter, B., et. al. (1977). Cross Sectional Anatomy: Computed Tomography and Ultrasound Correlation. Appleton-Century-Crofts. $52.50.

Chang, S. (1982). Echocardiography: Techniques and Interpretion 2nd Edition. Lea and Febiger. $22.50.

Cosgrove, D., & McCready, R. (1980). Ultrasound Imaging: Liver, Spleen, Pancreas. John Wiley and Sons, Inc. $75.00.

Feigenbaum, H. (1981). Echocardiography, 3rd Edition. Lea and Febiger. $35.00.

Fleischer, A., & Everette, J. (1980). Introduction to Diagnostic Sonography. John Wiley and Sons, Inc. $38.50.

Hagen, S. (1983). Textbook of Diagnostic Ultrasonography, 2nd Edition. C. V. Mosby. $54.95.

Hagen, S., & Teichman, E. (1980). Textbook of Diagnostic Ultrasonography. C. V. Mosby. $54.95.

Harper, P. (1983). Ultrasound Mammography. University Park Press. $39.50.

Hobbins, J. (1982). Ultrasonography in Obstetrics and Genecology 2nd Edition. Williams and Wilkins. $32.00.

Holm, H., & Kristensen, J. (1980). Abdominal Ultrasound. University Park Press. $29.50.

Kleid, J. (1978). Echocardiography: Interpretation and Diagnosis. Appleton-Century-Crofts. $39.50.

Kobayaski, M. (1980). Illustrated Manual of Ultrasonography in Ostetrics and Gynecology, 2nd Edition. Igaku-Shoin. $37.50.

Kremkau, F. (1980). Diagnostic Ultrasound. Grune and Stratton. $19.60

McDicken, W. N. (1981). Diagnostic Ultrasonics, 2nd Edition. John Wiley and Sons, Inc. $44.00.

Meyer, R. (1977). Pediatric Echocardiography. Lea and Febiger. $17.00.

Morley, P., et al. (1983). Ultrasonic Sectional Anatomy. Churchill Livingstone. Price not listed.

Moss, A., & Goldberg, H. (1979). Computed Tomgraphy, Ultrasound and X-Ray. Masson Publishing USA, Inc. $68.75.

Omoto, R., & Kobayashi, M. (1981). Atlas of Essential Ultrasound Imaging. Igaku-Shoin. $35.00.

Robert, D. (1983) Imaging in Heptobillary Disease. Blackwell/Mosby. $75.00.

Rose, J., & Goldberg, B. (1979). Basic Physics in Diagnostic Ultrasound. John Wiley and Sons, Inc. $38.50.

Sabbagha, R. (1979). Ultrasound in High-Risk Obstetrics. Lea and Febiger. $11.00

Sanders, R., & Everette, J. (1980). The Principles and Practice of Ultrasound in Obstetrics and Gynecology, 2nd Edition. Appleton-Century-Crofts. $54.95.

Sarti, D., & Sample, F. (1980). Diagnostic Ultrasound. $79.50.

Sarti, D. (1980). Obstetric and Gynecologic Ultrasound. No Price Listed.

Sigel, B. (1982). Operative Ultrasound. Lee and Febiger. $20.00.

Talano, J., & Gardin, J. (1983). Textbook of Two-Dimensional Echocardiography. Grune and Stratton. $45.00.

Taylor, K. Clinics in Diagnostic Ultrasound. Churchill Livingstone, Inc. 10 separate volumes. $22.00 per volume.

Weill, F. (1982). Ultrasonography Digestive Diseases, 2nd Edition. C. V. Mosby. $69.50.

Wicks, J. (1983). Fundementals of Ultrasound Techniques. $29.00.

Winsberg, F. (1983). Clinical Ultrasound Reviews, Volume 3. John Wiley and Sons, Inc. $68.95.

Yiu-Chiu, V., & Chiu, L. (1982). Atlas of Obstetrical Ultrasonography. University Park Press. $49.50.

Zwiebel, W. (1982). Introduction to Vascular Ultrasonography. Grune and Stratton. $49.50.

Video Tapes:

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Basic Physics of Ultrasound Imaging
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Characteristics and DNA in Vitro Free Rental

Slide Presentations:

Carson, P. The Interaction of Ultrasound in Tissues. Medcom, Inc. 44 slides. $99.00.

Cinefo, R. Ophthalmic Ultrasound. Medcom, Inc. 54 slides. $122.00.

Goldberg, B. Gray Scale Ultrasonography. Medcom, Inc. 100 slides. $148.00.

Haller, J. Pediatric Ultrasound Series, Parts 1, 2, and 3. Medcom, Inc. 165 slides. $366.00.

Lawson, T. Ultrasonic Diagnosis of Ectopic Pregnancy. Medcom, Inc. 46 slides. $99.00.

Naggar, C. Two-Dimensional Echocardiography Series. Medcom, Inc. 250 slides. $488.00.

Sander, R. Diagnostic Ultrasound in Obstetrics and Genecology, Parts 1 and 2. Medcom Inc. 120 slides. $244.00.

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Stone, L. Obstetrical and Fetal Ultrasonography. Medcom, Inc. 60 slides. $122.00.

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APPENDIX D (cont.)

BIBLIOGRAPHY: SOURCES OF STANDARDS

1. Athey, Patricia and McClendon, Linda. (1983). Diagnostic Ultrasound for Radiographers. Multi-Media Publishing, Inc.

2. Radiologic Technology Writing Team, Illinois.

3. United States Department of Labor. (1977). The Technologist's Function in Fields Related to Radiology: Tasks in Radiation Therapy and Diagnostic Ultrasound - Report # 9. Employment and Training Administration.

4. United States Department of Labor. (1977). Relating Technologist Tasks in Diagnostic Radiology, Ultrasound and Radiation Therapy - Report # 10. Employment and Training Administration.

5. V-TECS Catalog--Licensed Practical Nurse.(1982). Atlanta, Georgia. Vocational Technical Education Consortium of State.

6. V-TECS Catalog--Nuclear Medicine Technologist. (1981). Baltimore, Maryland. Vocational Technical Education Consortium of States.

7. V-TECS Catalog--Nurse's Aide/Orderly. (1976). Richmond, Virginia. Vocational Technical Education Consortium of State.

8. V-TECS Catalog--Radiographer. (1980). Athens, Georgia. Vocational Technical Education Consortium of State.

9. Wicks, Jeffery. (1980). Diagnostic Ultrasound. Grune and Stratton.